

VideoCAD

Program for professional CCTV system design

version 7.1 Lite

User manual

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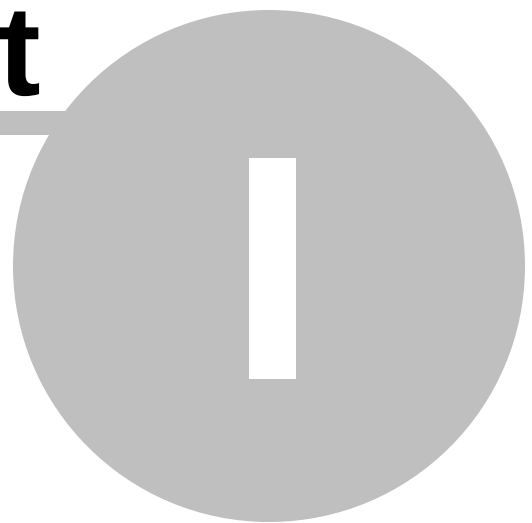
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Part



General information on VideoCAD 7 Professional

1 General information on VideoCAD 7 Professional

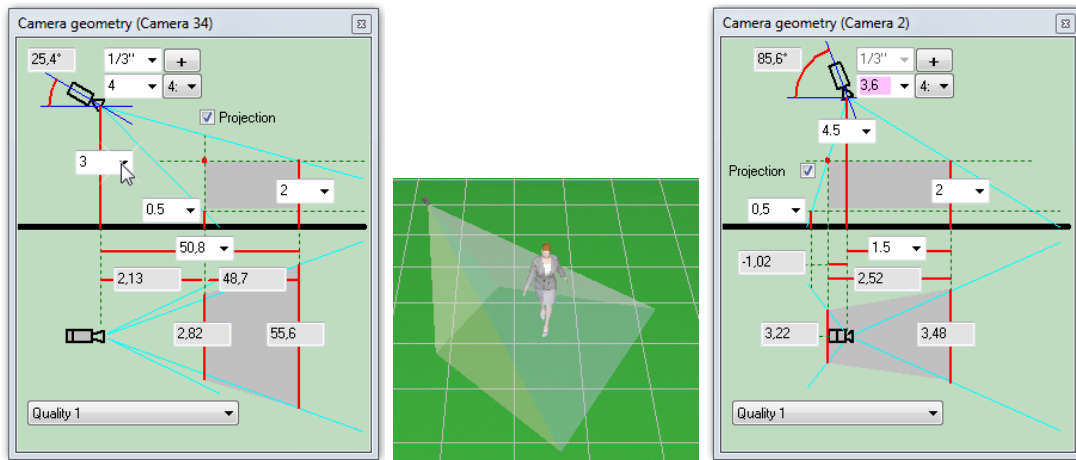
VideoCAD is a multifunctional tool for professional video surveillance system design, modeling parameters of video image and video equipment.

VideoCAD allows even the beginners to use the new opportunities appearing to be hard to obtain without it due to the complexity of calculations and therefore not being used even by the skilled engineers of CCTV.

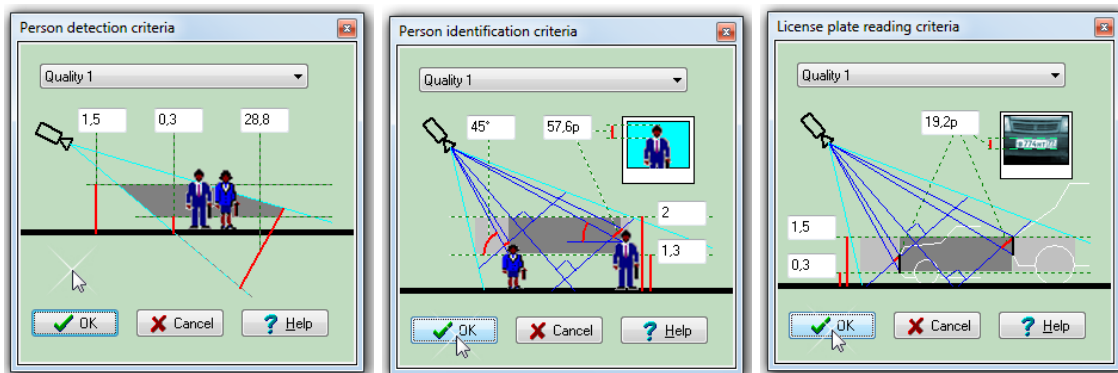
VideoCAD practically boosts the quality of CCTV design to a new level which appears to be beyond any competition with those lacking the program.

With VideoCAD you can:

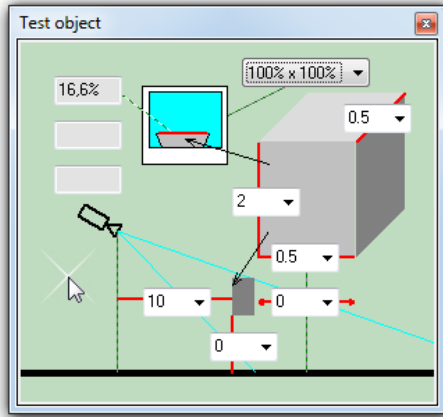
- Choose the most suitable **lenses**, **heights** and **locations** for camera installation to provide the required parameters of view areas.



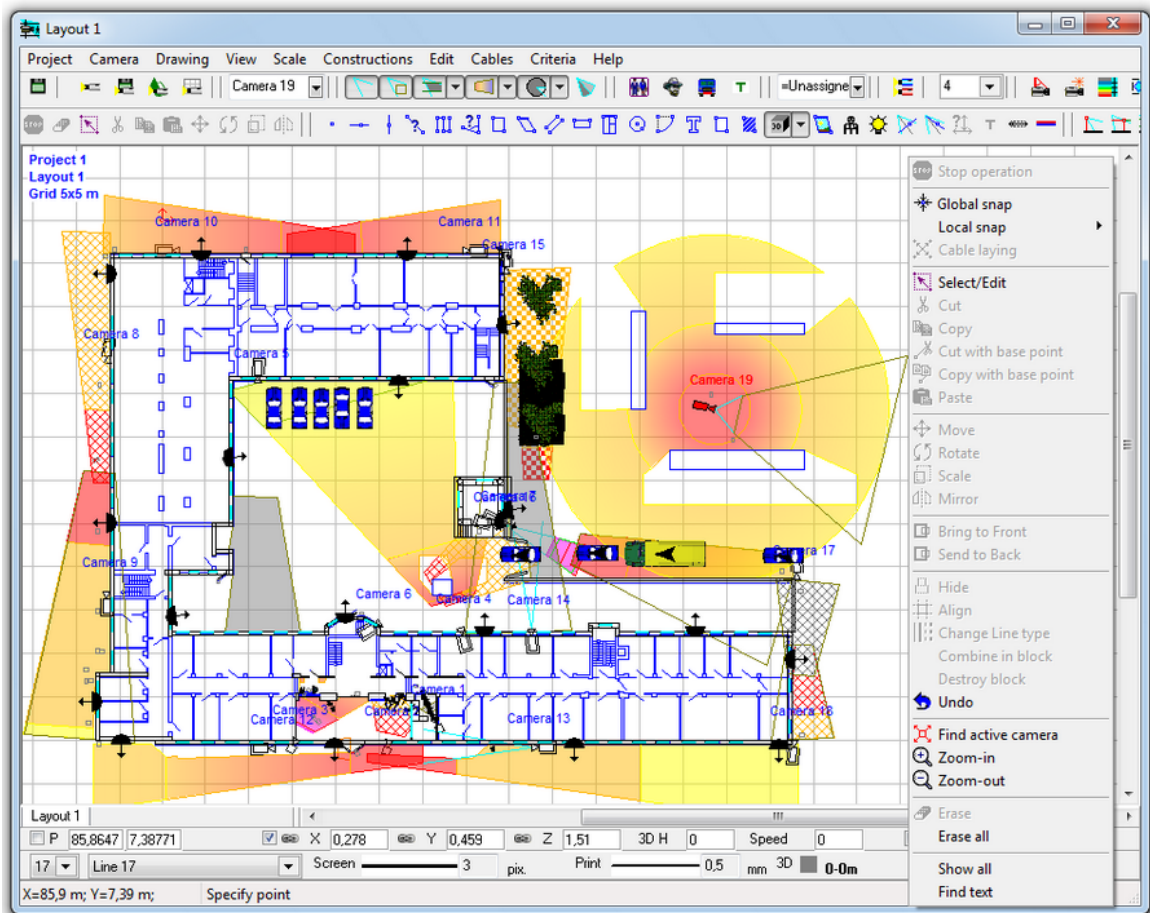
- Calculate the horizontal projection sizes of person detection, identification and license plate reading areas and draw them on the location plan.



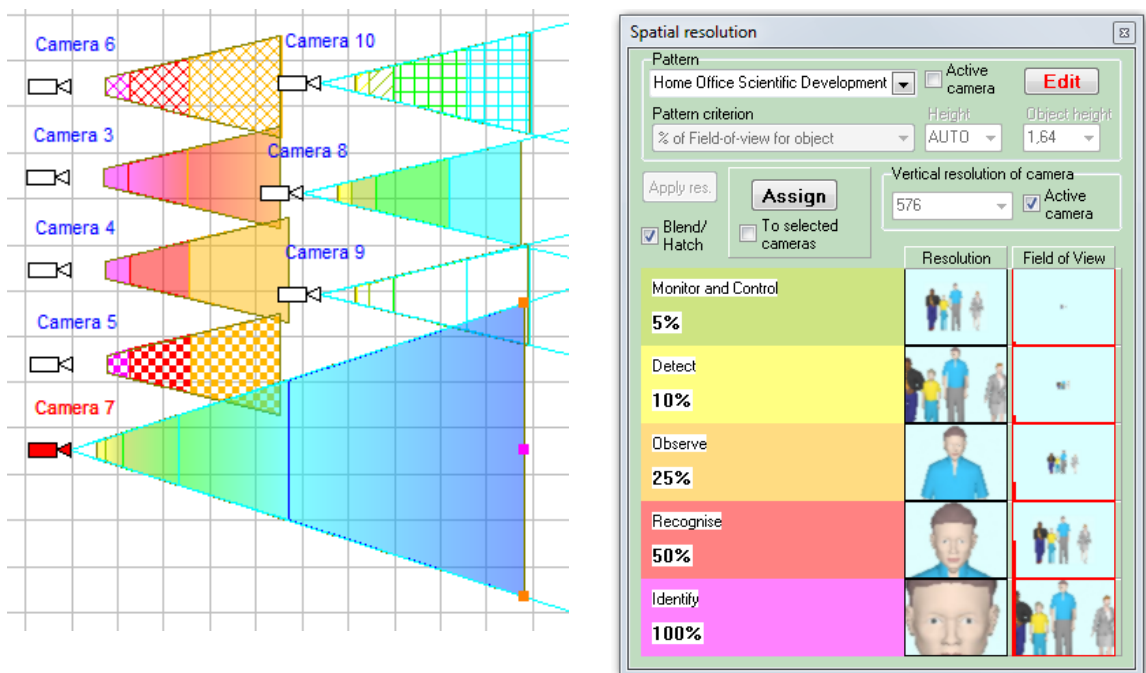
- Calculate the image size on display of any object in camera view area in percentage of display size, pixels, TV lines and millimetres (inches in case of Imperial format).



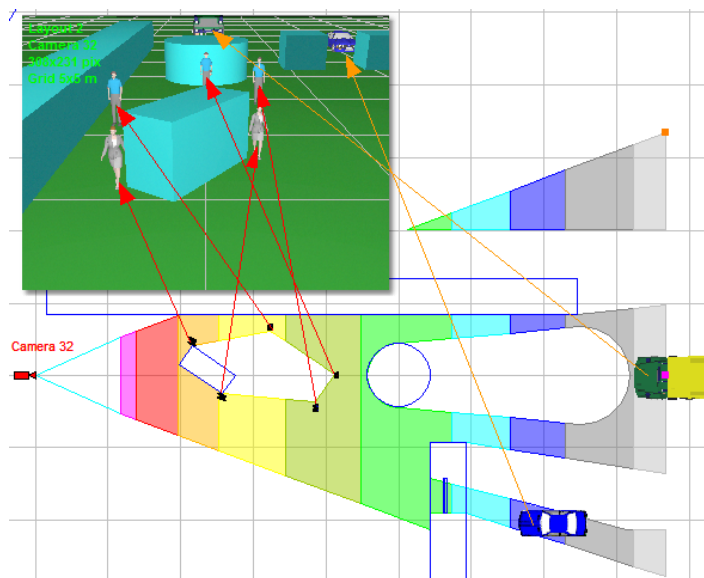
- Choose visually a relative location of cameras using the [graphics window](#)^[74] with CAD interface. Use a lot of 2D/3D constructions and CAD tools, line types, font types, horizontal and vertical projections, up to 10 layouts in each project.



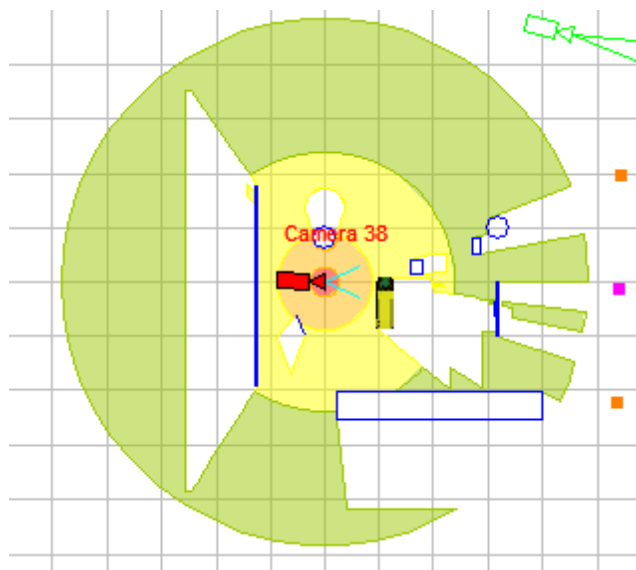
- Locate cameras and cables on the [prepared layouts](#)^[111] in *.bmp, *.jpg, *.emf, *.wmf, *.png, *.gif, *.tif, **AutoCAD *.dxf *.dwg** formats.
- Obtain a [drawing](#)^[110] containing two projections of site layout with the camera images, calculated view areas and cables, and with coordinate grid and titles to be used in graphical path of the project.
- [Print](#)^[113] the obtained drawing on one or several pages. You can use prepared frames with standard title-block and logo.
- [Export](#)^[110] the obtained drawing into any of the following formats: *.bmp, *.jpg, *.emf, *.wmf, *.png, *.gif, *.tif, **AutoCAD *.dxf (R14), AutoCAD *.dxf (R2000)**.
- Display by separate colors and hatch styles different regions of [spatial resolution](#)^[84] and field-of-view size. There are prepared spatial resolution patterns according to the following criteria: Home Office Scientific Development Branch; Home Office Guidelines for identification; P 78.36.008-99.



- Calculate the horizontal projection of camera control areas including [shadows](#)^[81] from obstacles on the scene.

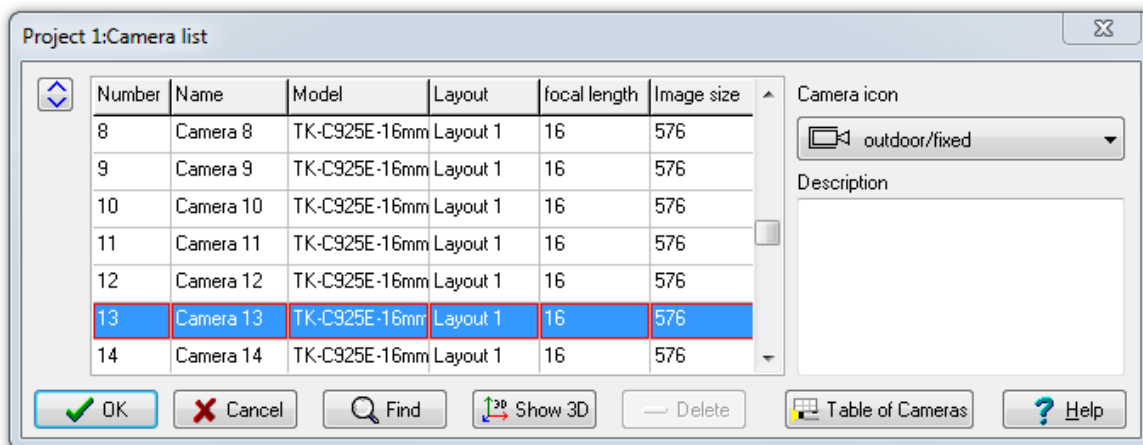


- Choose the best positions and calculate control areas of [PTZ cameras](#)^[242], Dome cameras and 360 degree cameras.

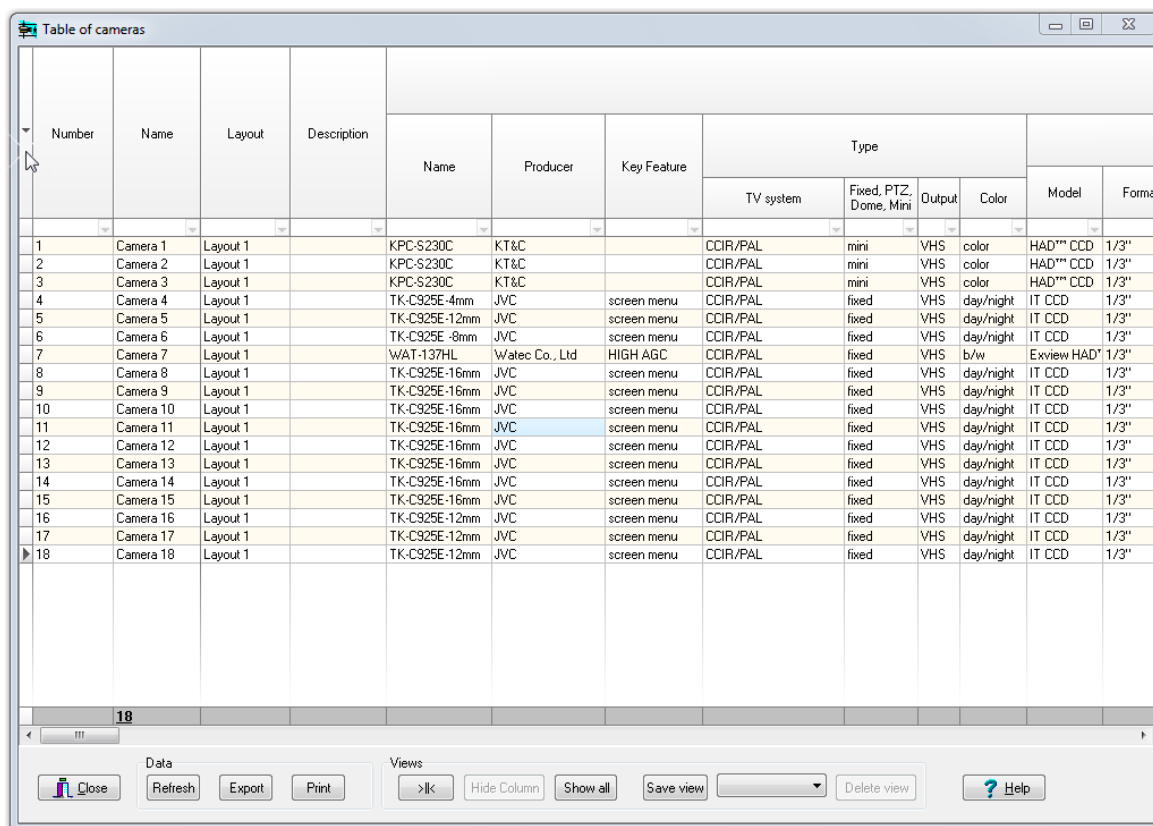


- Obtain a [text file](#)^[107] with full description of all cameras in the project, view areas and cables to be pasted into a project explanatory note or used as instruction for installation.

- Copy [the Camera list with most important parameters](#) [200] to MS Excel, MS Word and other software.



- Get detailed adjustable table of all initial and calculated parameters of cameras in project. Print the table or export it to *.txt, *.csv, *.rtf, *.xls, *.htm formats.



- Maintain database of camera models, assign different models for cameras in project, compare models with each other.

Number	Model Name	Producer	Key Feature	Type				Image sensor							Hor. resolution (TVL)	Max frame rate (fps)	Signal/ noise (dB) / (weight)
				TV system	Fixed, PTZ, Dome, Mini	Output	Color	Model	Format	Number of pixels		Scan	Aspect ratio	Row read time (mcs)			
										Horiz.	Vert.						
1	indoor stands				fixed				1/1.7"	352	512		4:3		sharp+1		84
2	indoor mini				mini												
3	indoor PTZ				PTZ				1/3"				4:3				
4	outdoor stands				fixed				4.8/3.6	352	512		4:3		sharp+1		84
5	outdoor mini JVC				mini							interleaved					
6	outdoor PTZ JVC	1231231231231			PTZ			Exview HAD* 1/3"					4:3				
7	TK-WD310E JVC		Wide Dynamic F	CCIR/PAL	fixed	VHS	easy day/ni	unknown	1/3"	720	540	interleaved	4:3		480		50
8	STC-3010/0 Smartec		full day/night	CCIR/PAL	fixed	VHS	day/night	Exview HAD* 1/3"		752	582	interleaved	4:3		500		50
9	STC-1000/0 Smartec			CCIR/PAL	fixed	VHS	b/w	Super HAD* 1/3"		752	582	interleaved	4:3		550		50
10	TK-C921EG JVC			CCIR/PAL	fixed	VHS	easy day/ni	IT CCD	1/3"	752	582	interleaved	4:3		540		50
11	QN-8309 QWONN		HIGH AGC	CCIR/PAL	fixed	VHS	b/w	Exview HAD* 1/3"		752	582	interleaved	4:3	25	564	3	51
12	QN-196 QWONN		Color-B/w	CCIR/PAL	fixed	VHS	color	HAD CCD	1/3"	752	582	interleaved	4:3		480		48
13	WAT-137HL Watec Co., Ltd		HIGH AGC	CCIR/PAL	fixed	VHS	b/w	Exview HAD* 1/3"		752	582	interleaved	4:3		500		51
14	KPC-190S81 KT&C			CCIR/PAL	mini	VHS	b/w	HAD CCD	1/3"	500	582	interleaved	4:3		375		50
15	KPC-190S81 KT&C			CCIR/PAL	mini	VHS	b/w	HAD CCD	1/3"	752	582	interleaved	4:3		550		50
16	KPC-400P KT&C			CCIR/PAL	mini	VHS	b/w	IT CCD	1/3"	500	582	interleaved	4:3		330		50
17	ACE-BX560C KT&C			CCIR/PAL	mini	VHS	b/w	Exview HAD* 1/3"		752	582	interleaved	4:3		550		50
18	KPC-S230C KT&C			CCIR/PAL	mini	VHS	color	HAD CCD	1/3"	500	582	interleaved	4:3		375		45
19	KPC-HD230C KT&C			CCIR/PAL	mini	VHS	color	Super HAD* 1/3"		752	582	interleaved	4:3		500		50
20	MC3710H-7X PELCO		twisted pair, gen	CCIR/PAL	fixed	twisted b/w	Super HAD* 1/3"			752		interleaved	4:3		564		50
21	TK-C925E JVC		screen menu	CCIR/PAL	fixed	VHS	day/night	IT CCD	1/3"	752	582	interleaved	4:3		540		50
22	STC-IP2070/0 Smartec		IP	N/A	fixed	Ethernet color	Super HAD* 1/3"			795		progressive	4:3	0	480		50

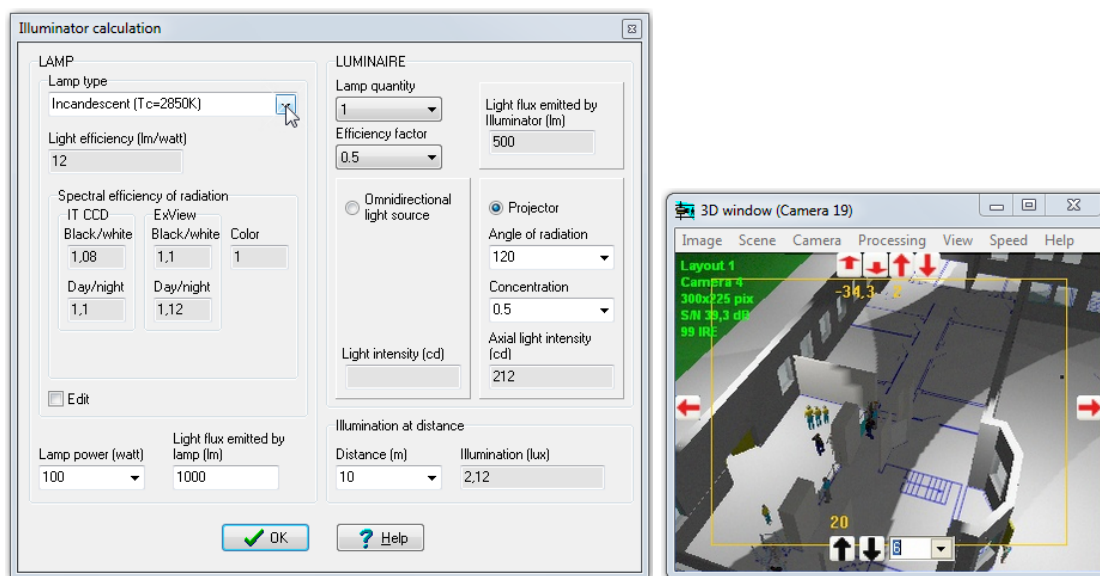
- Construct [three dimensional models](#)^[169] of real scenes with the possibility of loading prepared [3D models](#)^[128] (a person, a car, etc.,). You can add your own 3D models from [3ds max](#) and [Google Sketchup](#)^[255].



- Model observed scene parameters (illumination, visibility limitations).



- Model luminaires considering spectrum of radiation and spectral sensitivity of image sensors, including discharge lamps with complex spectrum and infrared LED illuminators.



- Model camera parameters (spectral response, number of pixels, resolution, minimum illumination at known signal/noise ratio, IRE and aperture, maximum signal/noise ratio, electronic shutter, AGC, BLC, gamma, day/night cameras, frame rate, interlace scan, global shutter and rolling shutter).

CAMERA

Color: Number of pixels: ☒ Resolution:

☐ ExView

Min. Illum. (lx): Aperture: S/N max.:

On sensor: AT: S/N (dB): S/N current:

exposure(ms): IRE:

☒ AESC Exposure time limits: - S

Current: S - Level +

☒ AGC Current: Maximum: ☐ Set

☐ BLC ☒ Gamma: Auto Iris DC: - Level +

- Model lens parameters (focal length, aperture, auto iris DC and Video Drive).

LENS

☒ Fixed Iris Aperture limits: -

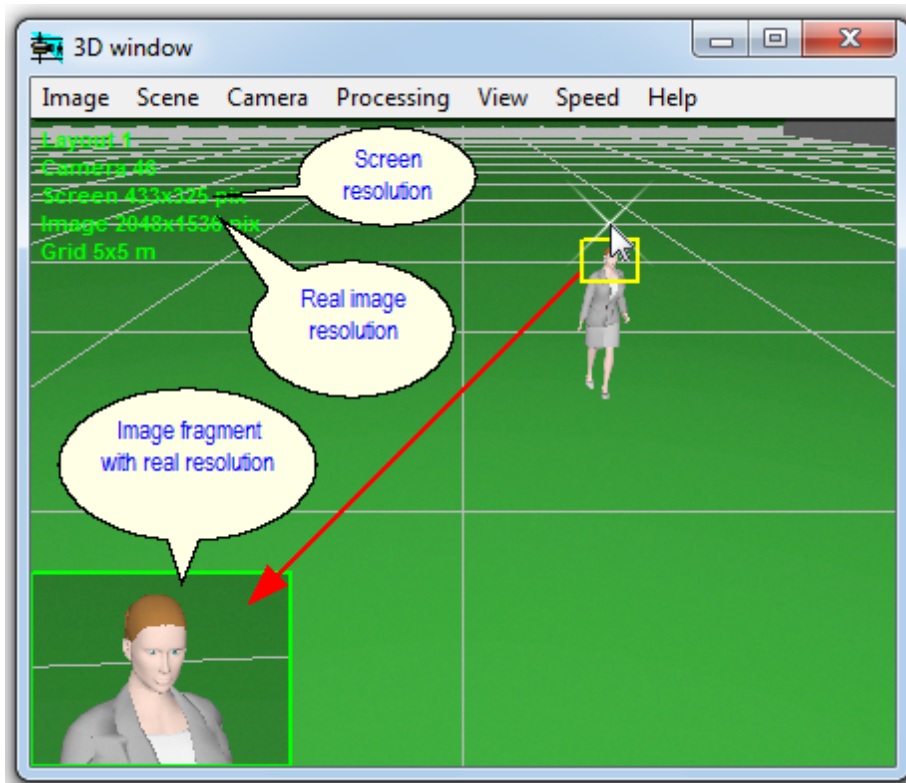
☐ Manual Iris Curr. aperture: Min. Illum.:

☐ Auto Iris ☒ DC - Level +

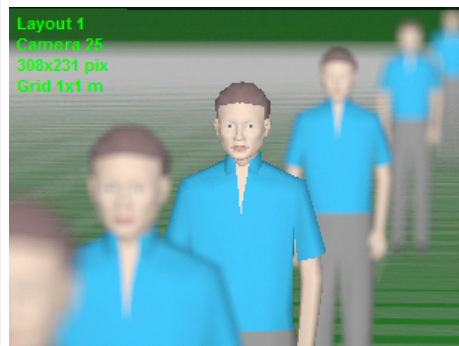
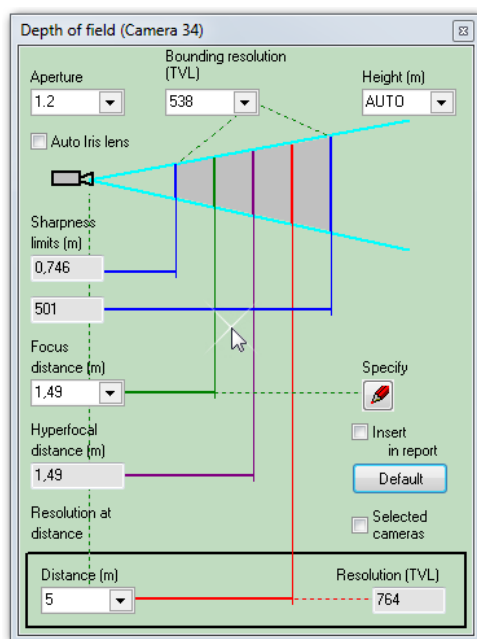
☐ Video Drive

Peek <> Average

- Model images from [megapixel cameras](#) ^[237] with resolution exceeds screen resolution (Up to 100 megapixel and more!).

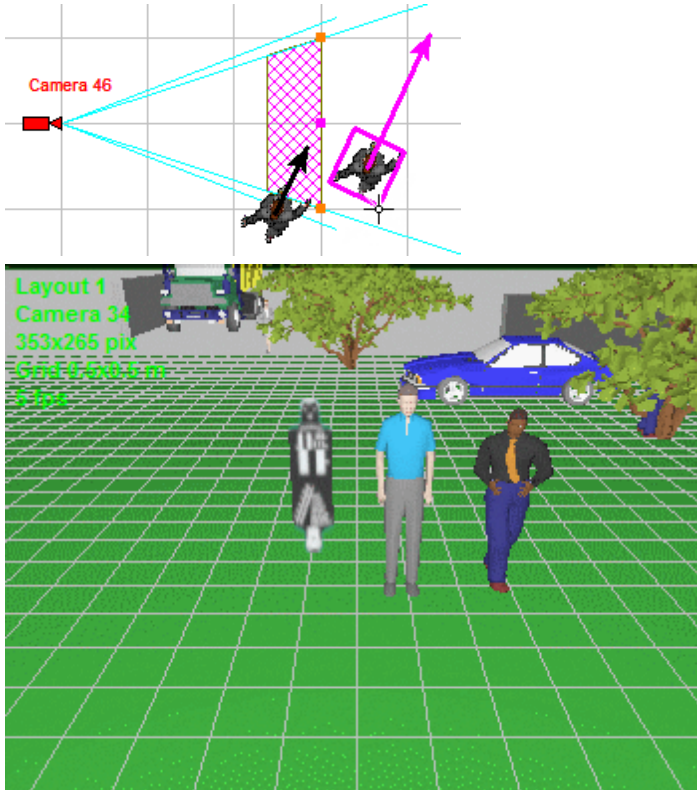


- Calculate and model depth of field of each camera in project.

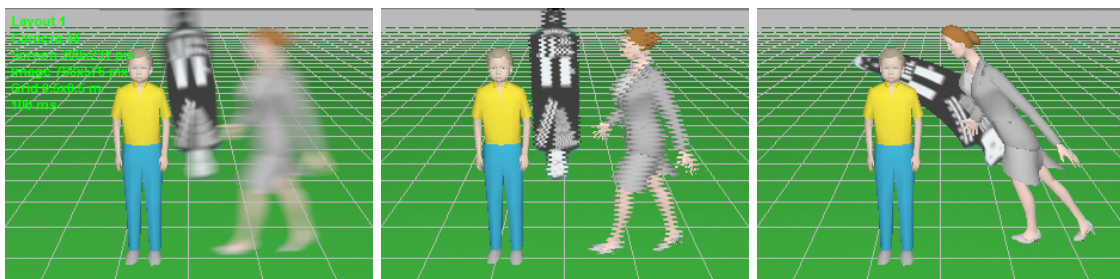


- Model brightness, contrast, compression, horizontal and vertical sharpness.

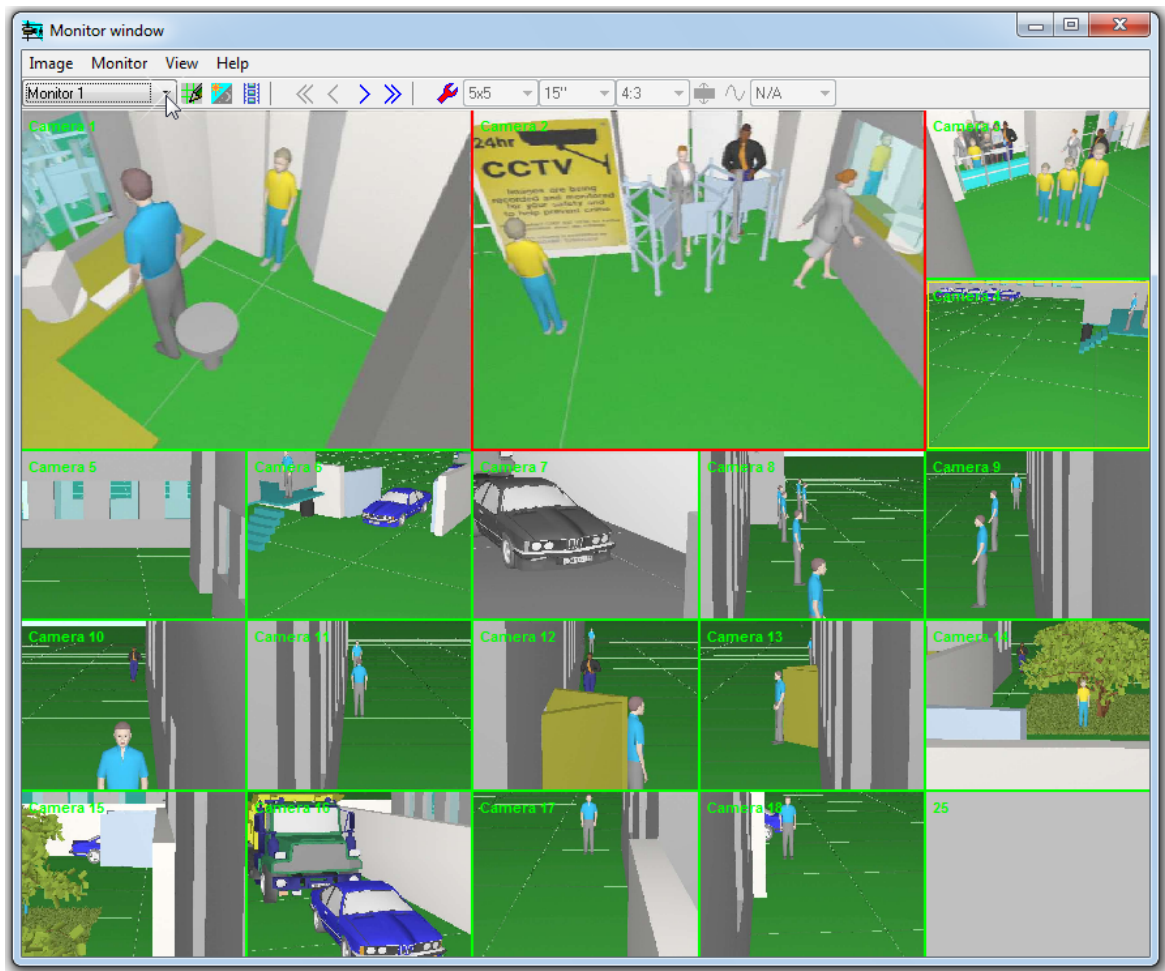
- Obtain [Image Model](#)^[169] for each camera in the project based on models of scene and equipment. This image can be printed and saved.
- Model [moving objects](#)^[81], camera [frame rate](#)^[238], create animated images with moving 3D models.



- Model [blur and distortion](#)^[243] of moving 3D models depending on camera parameters (exposure time, interlacing, rolling shutter).



- Design operator interface using the [Monitor window](#)^[175].



- Create [animated monitor models](#)^[239] as html files with moving 3D models and different frame rates of each camera.

- Calculate the [length](#)^[246] and electric parameters of [cables](#)^[206].

Power cable (Camera 2)

Cable brand	Line 26	Conductor cross-section area (mm2)	0.75
Total length of all segments in layouts (m)	0	Conductor diameter (mm)	0.98
Reserve for cable laying (%)	10	A/WG	-
Reserve for camera connection (m)	2	Cable resistance (Ohm) (both directions)	0.209
Reserve for source connection (m)	2	Voltage at cable start (V)	12
Cable length including reserves (m)	4	Consumption current (A)	0.117
Cable coil size (m)	250	Quantity of cameras	1
Cable coil number	1	Voltage at cable end (V)	12
Cable surplus (m)	246		

OK Cancel Help

- **Spare the means and win tenders due to the reduction of cameras' quantity in projects and increase of their efficiency.**
- **Reduce time expended and boost design quality.**
- **Cut down the amount of controversial situations with customers and accelerate their solution.**

VideoCAD does not use any simplified formulas and techniques, which in non-typical situations give considerable errors.

VideoCAD can be used for the prompt, but exact calculations of view area projections to draw on a location plan when performing a graphical part of CCTV project. It can be also used to perform scrupulous analysis complicated cases to choose the most suitable camera location and lens parameters.

VideoCAD is useful tool for security firms, army, police and security department of many companies.

VideoCAD can be effective at CCTV designer [training](#)^[256].

Part



General information on VideoCAD 7 Lite

2 General information on VideoCAD 7 Lite

VideoCAD is a multifunctional tool for professional video surveillance system design, modeling parameters of video image and video equipment.

VideoCAD allows even the beginners to use the new opportunities appearing to be hard to obtain without it due to the complexity of calculations and therefore not being used even by the skilled engineers of CCTV.

VideoCAD practically boosts the quality of CCTV design to a new level which appears to be beyond any competition with those lacking the program.

VideoCAD Lite is an inexpensive version of VideoCAD with limited features. VideoCAD Lite offers only the most useful and easy-to-master tools for CCTV design.

VideoCAD Lite may seem less demanding of computer resources because of absence of resource-intensive tools. However, these tools when they are not needed, can be [disabled](#)^[259] in version Professional too.

VideoCAD Lite can be available without USB dongle, it can be registered with tie to computer parameters (HID registration).

VideoCAD Lite can be upgraded to more powerful Professional version.

With VideoCAD Lite you can:

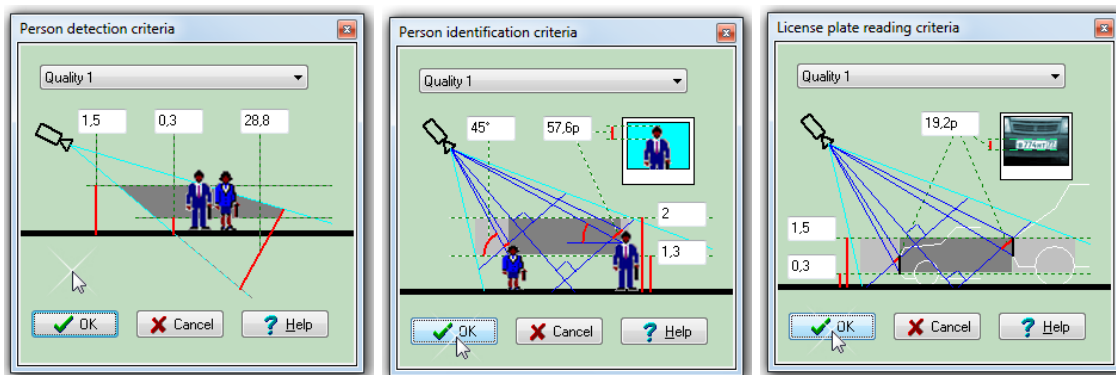
- Choose the most suitable **lenses**, **heights** and **locations** for camera installation to provide the required parameters of view areas.
- Calculate the horizontal projection sizes of view areas to draw them on the location plan.
- Display by separate colors and hatch styles different regions of [spatial resolution](#)^[84] and field-of-view size.
- Choose visually a relative location of cameras using the [graphics window](#)^[74] with CAD interface.
- Locate cameras and cables on the [prepared layouts](#)^[111] in *.bmp, *.jpg, *.emf, *.wmf, *.png, *.gif, *.tif, **AutoCAD *.dxf *.dwg** formats. To import *.dwg and *.dxf files the **CAD Import** module by **CAD Soft Tools** <http://www.cadsofttools.com> was used.
- Obtain a [drawing](#)^[110] containing two projections of site layout with the camera images, calculated view areas and cables, and with coordinate grid and titles to be used in graphical path of the project as well.
- [Print](#)^[113] the obtained drawing on one or several pages. You can use prepared frames with standard title-Block and logo.
- [Export](#)^[110] the obtained drawing into any of the following formats: *.bmp, *.jpg, *.emf, *.wmf, *.png, *.gif, *.tif, **AutoCAD *.dxf (R14)**, ***.dxf (R2000)**. [Flexible adjustments](#)^[195] of export parameters.
- Obtain a [text file](#)^[107] with full description of all cameras in project, view areas and cables to be pasted into a project explanatory note or used as instruction for installation.
- Copy [the Camera list with most important parameters](#)^[200] to MS Excel, MS Word and other software.
- Construct [three dimensional models](#)^[169] of real scenes with the possibility of loading prepared **3D models**^[128] (a person, a car, etc.). You can add your own 3D models from **3ds max** and [Google Sketchup](#)^[255].

- Design operator interface using the [Monitor window](#)^[175].
- Calculate the [length](#)^[246] and electric parameters of [cables](#)^[206].
- **Spare the means and win tenders due to the reduction of cameras' quantity in projects and increase of their efficiency.**
- **Reduce time expended and boost design quality.**
- **Cut down the amount of controversial situations with customers and accelerate their solution.**

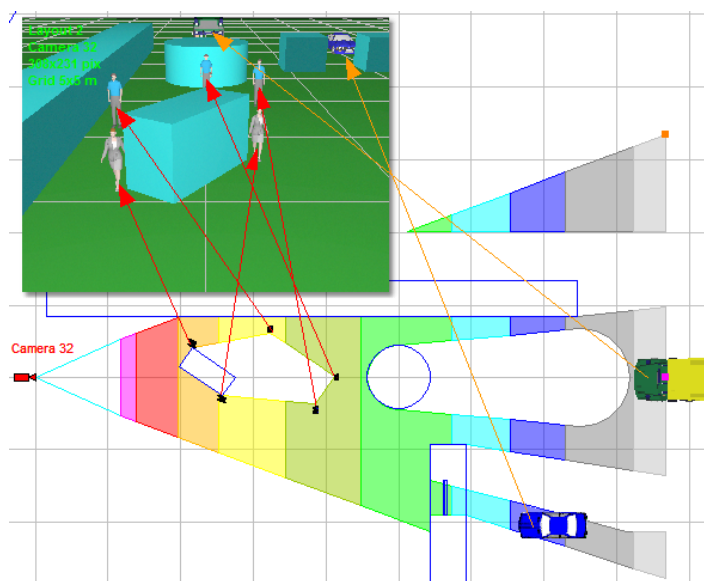
[Download VideoCAD Lite demo version](#)

With the VideoCAD Professional version you can in addition:

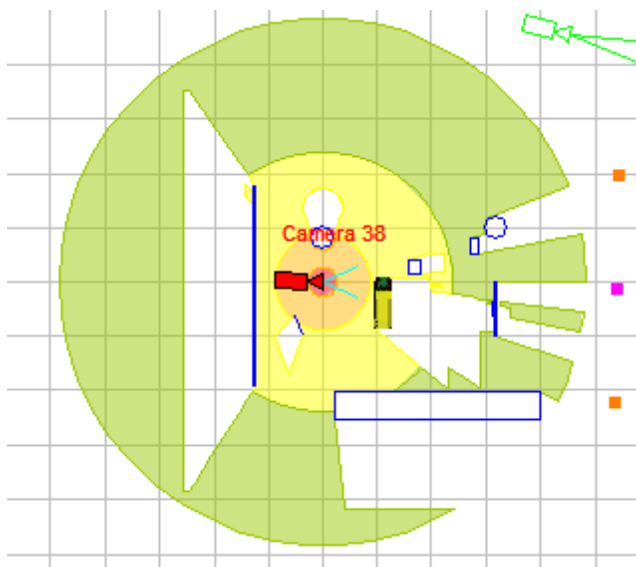
- Choose the most suitable **lenses, heights and locations** for camera installation to provide the required parameters of view areas for detection and identification of a person and license plate reading.
- Calculate the horizontal projection sizes of person detecting, identifying and license plate reading areas to draw them on the location plan.



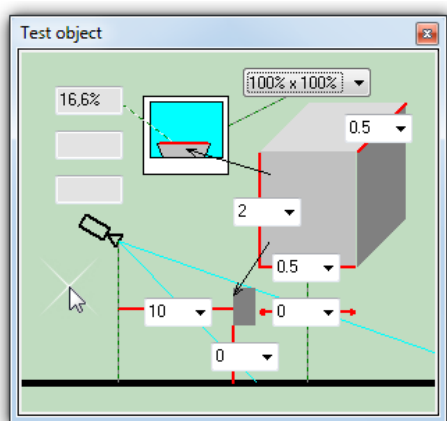
- Calculate the horizontal projection of camera control areas including [shadows](#)^[81] from obstacles on the scene.



- Choose the best positions and calculate control areas of [PTZ cameras](#) ^[242], Dome cameras and 360 degree cameras.



- Calculate the image size on display of any object in camera view area in percentage of display size, pixels, TV lines and millimetres (inches in case of Imperial format).



- Get detailed adjustable table of all initial and calculated parameters of cameras in project. Print the table or export it to *.txt, *.csv, *.rtf, *.xls, *.htm formats.

Table of cameras

Number	Name	Layout	Description	Name	Producer	Key Feature	Type					Model	Format
							TV system	Fixed, PTZ, Dome, Mini	Output	Color			
1	Camera 1	Layout 1		KPC-S230C	KT&C		CCIR/PAL	mini	VHS	color		HAD™ CCD	1/3"
2	Camera 2	Layout 1		KPC-S230C	KT&C		CCIR/PAL	mini	VHS	color		HAD™ CCD	1/3"
3	Camera 3	Layout 1		KPC-S230C	KT&C		CCIR/PAL	mini	VHS	color		HAD™ CCD	1/3"
4	Camera 4	Layout 1		TK-C925E-4mm	JVC	screen menu	CCIR/PAL	fixed	VHS	day/night		IT CCD	1/3"
5	Camera 5	Layout 1		TK-C925E-12mm	JVC	screen menu	CCIR/PAL	fixed	VHS	day/night		IT CCD	1/3"
6	Camera 6	Layout 1		TK-C925E-8mm	JVC	screen menu	CCIR/PAL	fixed	VHS	day/night		IT CCD	1/3"
7	Camera 7	Layout 1		WAT-137HL	Watec Co., Ltd	HIGH AGC	CCIR/PAL	fixed	VHS	b/w		Exview HAD™	1/3"
8	Camera 8	Layout 1		TK-C925E-16mm	JVC	screen menu	CCIR/PAL	fixed	VHS	day/night		IT CCD	1/3"
9	Camera 9	Layout 1		TK-C925E-16mm	JVC	screen menu	CCIR/PAL	fixed	VHS	day/night		IT CCD	1/3"
10	Camera 10	Layout 1		TK-C925E-16mm	JVC	screen menu	CCIR/PAL	fixed	VHS	day/night		IT CCD	1/3"
11	Camera 11	Layout 1		TK-C925E-16mm	JVC	screen menu	CCIR/PAL	fixed	VHS	day/night		IT CCD	1/3"
12	Camera 12	Layout 1		TK-C925E-16mm	JVC	screen menu	CCIR/PAL	fixed	VHS	day/night		IT CCD	1/3"
13	Camera 13	Layout 1		TK-C925E-16mm	JVC	screen menu	CCIR/PAL	fixed	VHS	day/night		IT CCD	1/3"
14	Camera 14	Layout 1		TK-C925E-16mm	JVC	screen menu	CCIR/PAL	fixed	VHS	day/night		IT CCD	1/3"
15	Camera 15	Layout 1		TK-C925E-16mm	JVC	screen menu	CCIR/PAL	fixed	VHS	day/night		IT CCD	1/3"
16	Camera 16	Layout 1		TK-C925E-12mm	JVC	screen menu	CCIR/PAL	fixed	VHS	day/night		IT CCD	1/3"
17	Camera 17	Layout 1		TK-C925E-12mm	JVC	screen menu	CCIR/PAL	fixed	VHS	day/night		IT CCD	1/3"
18	Camera 18	Layout 1		TK-C925E-12mm	JVC	screen menu	CCIR/PAL	fixed	VHS	day/night		IT CCD	1/3"

18

Close Refresh Export Print Views >|< Hide Column Show all Save view Delete view Help

- Maintain database of camera models, assign different models for cameras in project, compare models with each other.

Table of Camera Models

Number	Model Name	Producer	Key Feature	Type				Image sensor						Hor. resolution (TVL)	Max frame rate (fps)	Signal/Noise (dB) (weight)	
				TV system	Fixed, PTZ, Dome, Mini	Output	Color	Model	Format	Number of pixels		Scan	Aspect ratio				Row read time (mcs)
										Horiz.	Vert.						
1	indoor standa				fixed				1/1.7"	352	512		4:3		sharp+1		
2	indoor mini				mini											84	
3	indoor PTZ				PTZ				1/3"				4:3				
4	outdoor standa				fixed				4.8-3.6	352	512		4:3		sharp+1		
5	outdoor mini JVC				mini							interleaved				84	
6	outdoor PTZ JVC		1231231231231		PTZ			Exview HAD	1/3"				4:3				
7	TK-WD310E JVC		Wide Dynamic F	CCIR/PAL	fixed	VHS	easy day/ni	unknown	1/3"	720	540	interleaved	4:3		480	50	
8	STC-3010/0 Smartec		full day/night	CCIR/PAL	fixed	VHS	day/night	Exview HAD	1/3"	752	582	interleaved	4:3		500	50	
9	STC-1000/0 Smartec			CCIR/PAL	fixed	VHS	b/w	Super HAD	1/3"	752	582	interleaved	4:3		550	50	
10	TK-C921EG JVC			CCIR/PAL	fixed	VHS	easy day/ni	IT CCD	1/3"	752	582	interleaved	4:3		540	50	
11	QN-8309 QWONN		HIGH AGC	CCIR/PAL	fixed	VHS	b/w	Exview HAD	1/3"	752	582	interleaved	4:3	25	564	3 51	
12	QN-196 QWONN		Color-8/W	CCIR/PAL	fixed	VHS	color	HAD CCD	1/3"	752	582	interleaved	4:3		480	48	
13	WAT-137HL Water Co., Ltd		HIGH AGC	CCIR/PAL	fixed	VHS	b/w	Exview HAD	1/3"	752	582	interleaved	4:3		500	51	
14	KPC-1905B1 KT&C			CCIR/PAL	mini	VHS	b/w	HAD CCD	1/3"	500	582	interleaved	4:3		375	50	
15	KPC-1905B1 KT&C			CCIR/PAL	mini	VHS	b/w	HAD CCD	1/3"	752	582	interleaved	4:3		550	50	
16	KPC-400P KT&C			CCIR/PAL	mini	VHS	b/w	IT CCD	1/3"	500	582	interleaved	4:3		330	50	
17	ACE-E560C KT&C			CCIR/PAL	mini	VHS	b/w	Exview HAD	1/3"	752	582	interleaved	4:3		550	50	
18	KPC-S230C KT&C			CCIR/PAL	mini	VHS	color	HAD CCD	1/3"	500	582	interleaved	4:3		375	45	
19	KPC-HD230C KT&C			CCIR/PAL	mini	VHS	color	Super HAD	1/3"	752	582	interleaved	4:3		500	50	
20	MC3710H-ZX PELCO		twisted pair, gen	CCIR/PAL	fixed	twisted b/w		Super HAD	1/3"	752		interleaved	4:3		564	50	
21	TK-C925E JVC		screen menu	CCIR/PAL	fixed	VHS	day/night	IT CCD	1/3"	752	582	interleaved	4:3		540	50	
22	STC-IP2070/ Smartec		IP	N/A	fixed	Ethernet	color	Super HAD	1/3"	795		progressive	4:3	0	480	50	

Camera model

Assign

New Edit Delete

Data

Save Load Export Print

Views

>< Hide Columns Show all Save view

Delete view

- Model observed scene parameters (illumination, visibility limitations).



- Model luminaires considering spectrum of radiation and spectral sensitivity of image sensors, including discharge lamps with complex spectrum and infrared LED illuminators.

Illuminator calculation

LAMP

Lamp type
Incandescent (Tc=2850K)

Light efficiency (lm/watt)
12

Spectral efficiency of radiation

IT CCD	ExView	Color
Black/white	Black/white	Color
1,08	1,1	1
Day/night	Day/night	
1,1	1,12	

☐ Edit

Lamp power (watt)
100

Light flux emitted by lamp (lm)
1000

LUMINAIRE

Lamp quantity
1

Efficiency factor
0.5

Light flux emitted by illuminator (lm)
500

☐ Omnidirectional light source

☒ Projector

Angle of radiation
120

Concentration
0.5

Axial light intensity (cd)
212

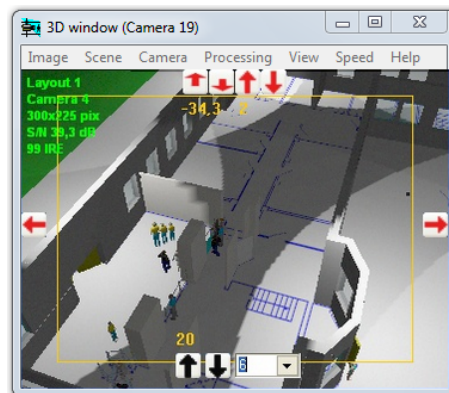
Light intensity (cd)

Illumination at distance

Distance (m)
10

Illumination (lux)
2,12

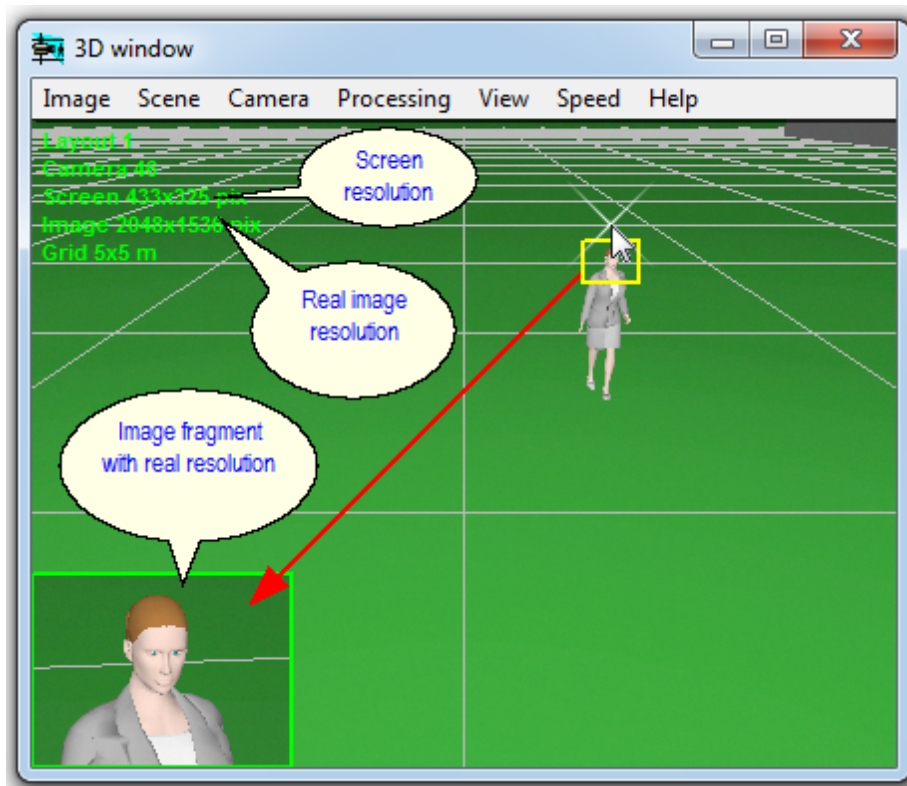
☒ OK ☐ Help



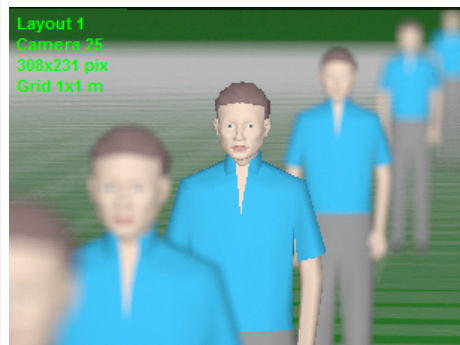
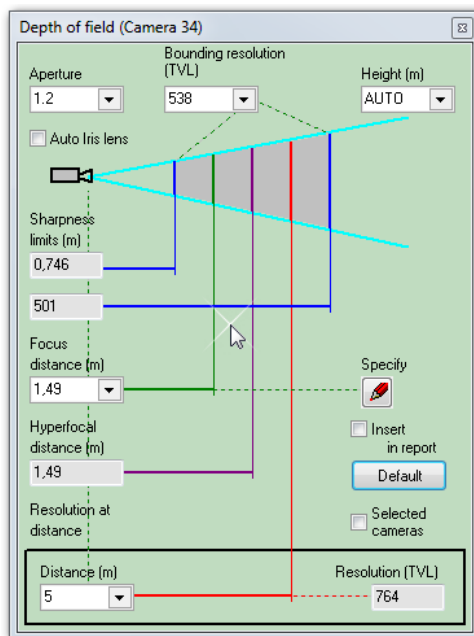
- Model camera parameters (spectral response, number of pixels (including [megapixel cameras](#) ^[237] with resolution exceeds screen resolution), resolution, minimum illumination at known signal/noise ratio, IRE and aperture, maximum signal/noise ratio, electronic shutter, AGC, BLC, gamma, day/night cameras, frame rate, interlace, global shutter and rolling shutter).

- Model lens parameters (focal length, aperture, auto iris DC and Video Drive).

- Model images from [megapixel cameras](#) ^[237] with resolution exceeds screen resolution (Up to 100 megapixel and more!).

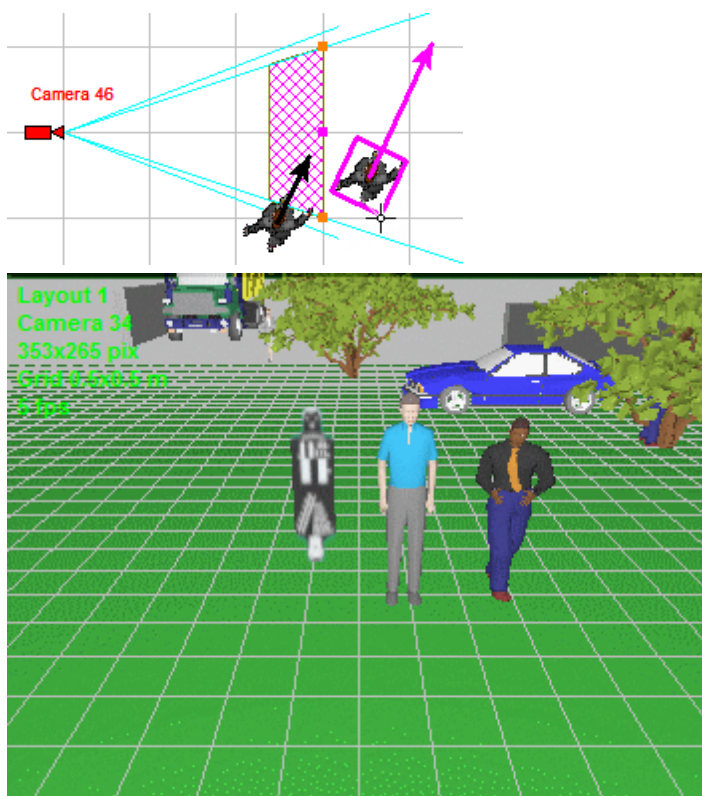


- Calculate and model depth of field of each camera in project.

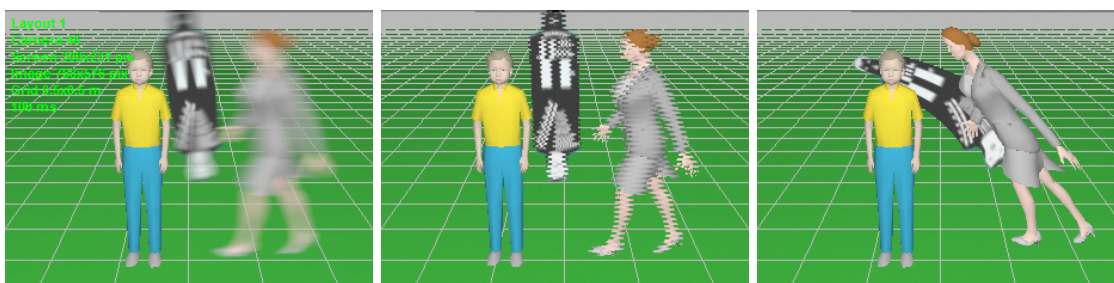


- Model DVR parameters (brightness, contrast, compression, horizontal and vertical sharpness).
- Obtain [Image Model](#)¹⁶⁹ for each camera in the project based on models of scene and equipment. This image can be printed and saved.

- Model [moving objects](#)^[81], camera [frame rate](#)^[238], create animated images with moving 3D models.



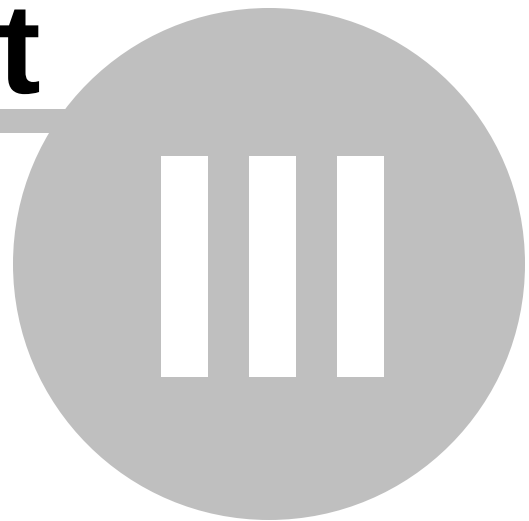
- Model [blur and distortion](#)^[243] of moving 3D models depending on camera parameters.



- Create [animated monitor models](#)^[239] as html files with moving 3D models and different frame rates of each camera.

[Download VideoCAD Professional demo version](#)

Part



General information on VideoCAD 7 Starter

3 General information on VideoCAD 7 Starter

VideoCAD Starter - the easiest, low cost version of VideoCAD.

VideoCAD Starter is less demanding of computer resources because of absence of resource-intensive tools.

VideoCAD Starter is registered only by personal registration code. This code doesn't depend on computer hardware or a dongle. This code is valid on any computer.

VideoCAD Starter can not be upgraded to more powerful Lite and Professional versions.

VideoCAD Starter is also offered in the VideoCAD Starter Kit. It is a kit of three programs at the special price, including:

- [VideoCAD Starter](#);
- [IP Camera CCTV Calculator](#);
- [VideoCAD Plugin for Google SketchUp](#).

With VideoCAD Starter you can:

- Choose the most suitable **lenses**, **heights** and **locations** for camera installation to provide the required parameters of view areas.
- Calculate the horizontal projection sizes of view areas to draw them on the location plan.
- Display by separate colors different regions of [spatial resolution](#)^[84] and field-of-view size.
- Choose visually a relative location of cameras using the [graphics window](#)^[74] with CAD interface.
- Locate cameras on the [prepared layouts](#)^[111] in *.bmp, *.jpg, AutoCAD *.dxf *.dwg formats.
- Obtain a [drawing](#)^[110] containing horizontal projection of site layout with the camera images, calculated view areas, and with coordinate grid to be used in graphical path of the project.
- [Export](#)^[110] the obtained drawing into any of the following formats: *.bmp, *.jpg. [Saving the drawing](#)^[110] in the Graphics windows with **resolution exceeding Windows screen resolution**.
- Copy [the Camera list with most important parameters](#)^[200] to MS Excel, MS Word and other software.
- Construct [three dimensional models](#)^[169] of real scenes.
- Use many [3D models](#)^[98] (people, cars, bus, furniture, turnstile, tree, grass). You can add other 3D models from 3ds max and [Google Sketchup](#)^[255].
- **Spare the means and win tenders due to the reduction of cameras' quantity in projects and increase of their efficiency.**
- **Reduce time expended and boost design quality.**
- **Cut down the amount of controversial situations with customers and accelerate their solution.**

[Download VideoCAD Starter demo version](#)



With the VideoCAD Lite version you can in addition:

- **Use more than 30 additional constructions and CAD tools** (Point, Horizontal line, Vertical

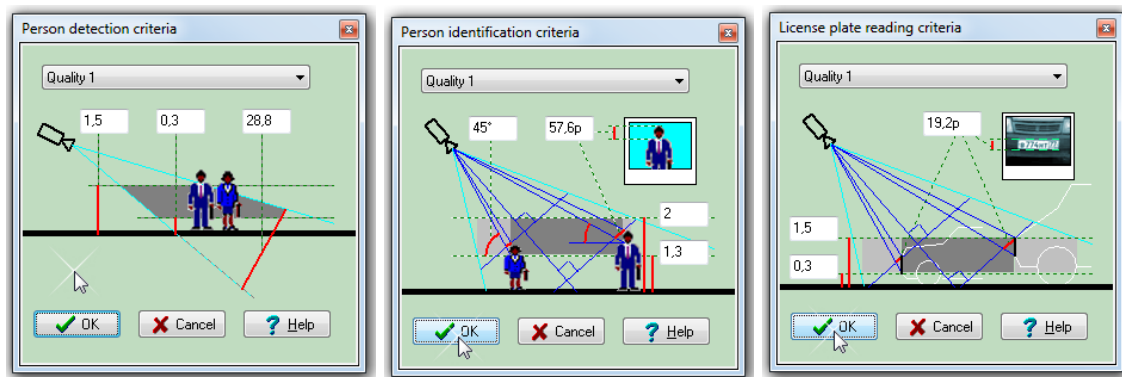
line, Line segment, Angle, Double line, Arc, Mask, Filling, Text, 3D image, Inclined rectangle, Change installation height, Change view area upper bound, Change view area lower bound, Copy with base point, Cut with base point, Scale, Mirror, Change line type, Hide camera names, Cameras over constructions, Bring to front, Send to back, Hide, Align, Combine in block, Destroy block, Find text, Hidden state of objects, Numerate cameras, Length calculation of line segments).

- Use up to 10 [layouts](#)^[141] in each project.
- Model cameras with [non standard image sensor size](#)^[157] and aspect ratio.
- Use up to 30 [spatial resolution patterns](#)^[158] in each project. Each pattern can contain up to 10 regions. Adjust [object height](#)^[161] in the patterns, [height of measuring spatial resolution](#)^[161]. The Spatial resolution box contains models of [field-of-view images](#)^[162] for each region in current pattern.
- Use gradient color and hatching for visualization of spatial resolution.
- Locate cameras and cables on the [prepared layouts](#)^[111] in *.emf, *.wmf, *.png, *.gif, *.tif.
- Work with [vertical projection](#)^[86] of the site plan.
- Use [Titles](#)^[117] и [texts](#)^[98] on the drawing. Different [fonts](#)^[188] are supported.
- Show view area projections by different colors and hatch styles, using different line types. Use different camera icons (fixed, PTZ, outdoor..).
- [Print](#)^[113] the obtained drawing on one or several pages. You can use prepared frames with standard title-block and logo.
- [Export](#)^[110] the obtained drawing into any of the following formats: *.emf, *.wmf, *.png, *.gif, *.tif, **AutoCAD *.dxf (R14), AutoCAD *.dxf (R2000)**. [Flexible adjustments](#)^[195] of resolution and other export parameters.
- Obtain a [text file](#)^[107] with full description of all cameras in the project, view areas and cables to be pasted into a project explanatory note or used as instruction for installation.
- [Print](#)^[171] image in 3D window. Use titles, test chart EIA1956 in the 3D window.
- Design operator interface using the [Monitor window](#)^[175].
- Calculate the [length](#)^[246] and electric parameters of [cables](#)^[206].
- Adjust [keyboard shortcuts](#)^[190] for each item in the Main menu.
- Adjust [visibility](#)^[197] of buttons on the Toolbar.

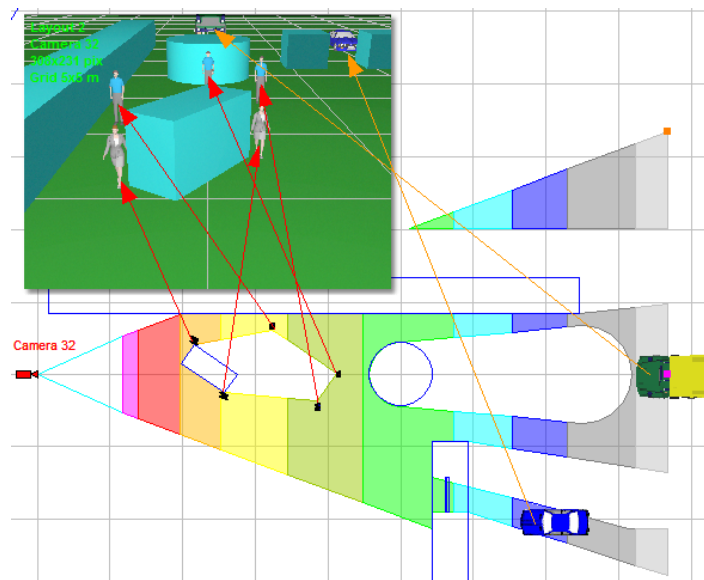
[Download VideoCAD Lite demo version](#)

With the VideoCAD Professional version you can in addition:

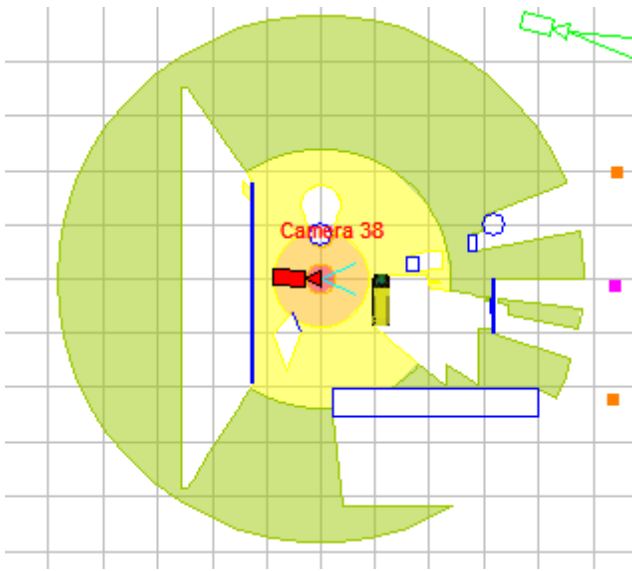
- Choose the most suitable **lenses**, **heights** and **locations** for camera installation to provide the required parameters of view areas for detection and identification of a person and license plate reading.
- Calculate the horizontal projection sizes of person detecting, identifying and license plate reading areas to draw them on the location plan.



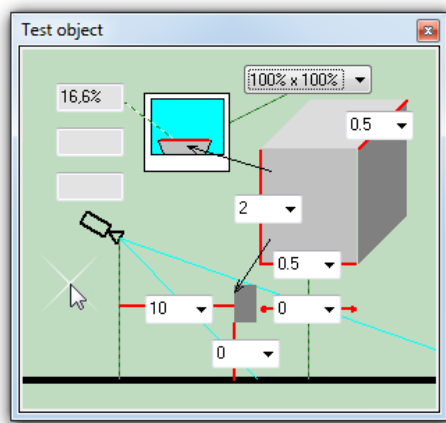
- Calculate the horizontal projection of camera control areas including [shadows](#)^[81] from obstacles on the scene.



- Choose the best positions and calculate control areas of [PTZ cameras](#)^[242], Dome cameras and 360 degree cameras.



- Calculate the image size on display of any object in camera view area in percentage of display size, pixels, TV lines and millimetres (inches in case of Imperial format).



- Get detailed adjustable table of all initial and calculated parameters of cameras in project. Print the table or export it to *.txt, *.csv, *.rtf, *.xls, *.htm formats.

Table of cameras

Number	Name	Layout	Description	Name	Producer	Key Feature	Type				Model	Format
							TV system	Fixed, PTZ, Dome, Mini	Output	Color		
1	Camera 1	Layout 1		KPC-S230C	KT&C		CCIR/PAL	mini	VHS	color	HAD*** CCD	1/3"
2	Camera 2	Layout 1		KPC-S230C	KT&C		CCIR/PAL	mini	VHS	color	HAD*** CCD	1/3"
3	Camera 3	Layout 1		KPC-S230C	KT&C		CCIR/PAL	mini	VHS	color	HAD*** CCD	1/3"
4	Camera 4	Layout 1		TK-C925E-4mm	JVC	screen menu	CCIR/PAL	fixed	VHS	day/night	IT CCD	1/3"
5	Camera 5	Layout 1		TK-C925E-12mm	JVC	screen menu	CCIR/PAL	fixed	VHS	day/night	IT CCD	1/3"
6	Camera 6	Layout 1		TK-C925E-8mm	JVC	screen menu	CCIR/PAL	fixed	VHS	day/night	IT CCD	1/3"
7	Camera 7	Layout 1		WAT-137HL	Water Co., Ltd	HIGH AGC	CCIR/PAL	fixed	VHS	b/w	Exview HAD*	1/3"
8	Camera 8	Layout 1		TK-C925E-16mm	JVC	screen menu	CCIR/PAL	fixed	VHS	day/night	IT CCD	1/3"
9	Camera 9	Layout 1		TK-C925E-16mm	JVC	screen menu	CCIR/PAL	fixed	VHS	day/night	IT CCD	1/3"
10	Camera 10	Layout 1		TK-C925E-16mm	JVC	screen menu	CCIR/PAL	fixed	VHS	day/night	IT CCD	1/3"
11	Camera 11	Layout 1		TK-C925E-16mm	JVC	screen menu	CCIR/PAL	fixed	VHS	day/night	IT CCD	1/3"
12	Camera 12	Layout 1		TK-C925E-16mm	JVC	screen menu	CCIR/PAL	fixed	VHS	day/night	IT CCD	1/3"
13	Camera 13	Layout 1		TK-C925E-16mm	JVC	screen menu	CCIR/PAL	fixed	VHS	day/night	IT CCD	1/3"
14	Camera 14	Layout 1		TK-C925E-16mm	JVC	screen menu	CCIR/PAL	fixed	VHS	day/night	IT CCD	1/3"
15	Camera 15	Layout 1		TK-C925E-16mm	JVC	screen menu	CCIR/PAL	fixed	VHS	day/night	IT CCD	1/3"
16	Camera 16	Layout 1		TK-C925E-12mm	JVC	screen menu	CCIR/PAL	fixed	VHS	day/night	IT CCD	1/3"
17	Camera 17	Layout 1		TK-C925E-12mm	JVC	screen menu	CCIR/PAL	fixed	VHS	day/night	IT CCD	1/3"
18	Camera 18	Layout 1		TK-C925E-12mm	JVC	screen menu	CCIR/PAL	fixed	VHS	day/night	IT CCD	1/3"

18

Close

Refresh

Export

Print

><

Hide Column

Show all

Save view

Delete view

Help

- Maintain database of camera models, assign different models for cameras in project, compare models with each other.

Table of Camera Models

Number	Model Name	Producer	Key Feature	Type				Image sensor						Hor. resolution (TVL)	Max frame rate (fps)	Signal/ (dB) / (weight)		
				TV system	Fixed, PTZ, Dome, Mini	Output	Color	Model	Format	Number of pixels		Scan	Aspect ratio				Row read time (mcs)	
										Horiz.	Vert.							
1	indoor standa				fixed				1/1.7"	352	512		4:3		sharp+1			
2	indoor mini				mini												84	
3	indoor PTZ				PTZ				1/3"				4:3					
4	outdoor standa				fixed				4.8-3.6	352	512		4:3		sharp+1			
5	outdoor mini	JVC			mini							interleaved					84	
6	outdoor PTZ	JVC	1231231231231		PTZ			Exview HAD*	1/3"				4:3					
7	TK-WD310E	JVC	Wide Dynamic F	CCIR/PAL	fixed	VHS	easy day/ni	unknown	1/3"	720	540	interleaved	4:3			480		50
8	STC-3010/0	Smartec	full day/night	CCIR/PAL	fixed	VHS	day/night	Exview HAD*	1/3"	752	582	interleaved	4:3			500		50
9	STC-1000/0	Smartec		CCIR/PAL	fixed	VHS	b/w	Super HAD***	1/3"	752	582	interleaved	4:3			550		50
10	TK-C921EG	JVC		CCIR/PAL	fixed	VHS	easy day/ni	IT CCD	1/3"	752	582	interleaved	4:3			540		50
11	QN-8309	QWONN	HIGH AGC	CCIR/PAL	fixed	VHS	b/w	Exview HAD*	1/3"	752	582	interleaved	4:3	25		564	3	51
12	QN-196	QWONN	Color 8/4w	CCIR/PAL	fixed	VHS	color	HAD CCD	1/3"	752	582	interleaved	4:3			480		48
13	WAT-137HL	Water Co., Ltd	HIGH AGC	CCIR/PAL	fixed	VHS	b/w	Exview HAD*	1/3"	752	582	interleaved	4:3			500		51
14	KPC-1905B1	KT&C		CCIR/PAL	mini	VHS	b/w	HAD CCD	1/3"	500	582	interleaved	4:3			375		50
15	KPC-1905B1	KT&C		CCIR/PAL	mini	VHS	b/w	HAD CCD	1/3"	752	582	interleaved	4:3			550		50
16	KPC-400P	KT&C		CCIR/PAL	mini	VHS	b/w	IT CCD	1/3"	500	582	interleaved	4:3			330		50
17	ACE-EX560C	KT&C		CCIR/PAL	mini	VHS	b/w	Exview HAD*	1/3"	752	582	interleaved	4:3			550		50
18	KPC-S230C	KT&C		CCIR/PAL	mini	VHS	color	HAD CCD	1/3"	500	582	interleaved	4:3			375		45
19	KPC-HD230C	KT&C		CCIR/PAL	mini	VHS	color	Super HAD***	1/3"	752	582	interleaved	4:3			500		50
20	MC3710H-ZA	PELCO	twisted pair, gen	CCIR/PAL	fixed	twisted b/w		Super HAD***	1/3"	752		interleaved	4:3			564		50
21	TK-C925E	JVC	screen menu	CCIR/PAL	fixed	VHS	day/night	IT CCD	1/3"	752	582	interleaved	4:3			540		50
22	STC-IP2070/	Smartec	IP	N/A	fixed	Ethernet	color	Super HAD***	1/3"	795		progressive	4:3	0		480		50

Camera model

AssignNewEditDelete

Data

SaveLoadExportPrint

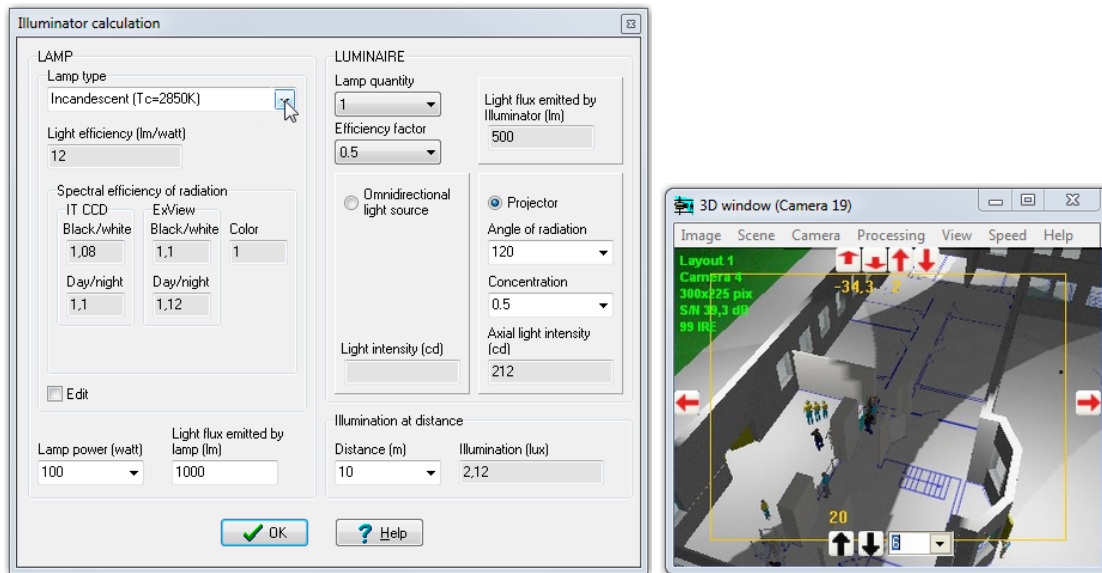
Views

><Hide ColumnsShow allSave viewDelete view

- Model observed scene parameters (illumination, visibility limitations).



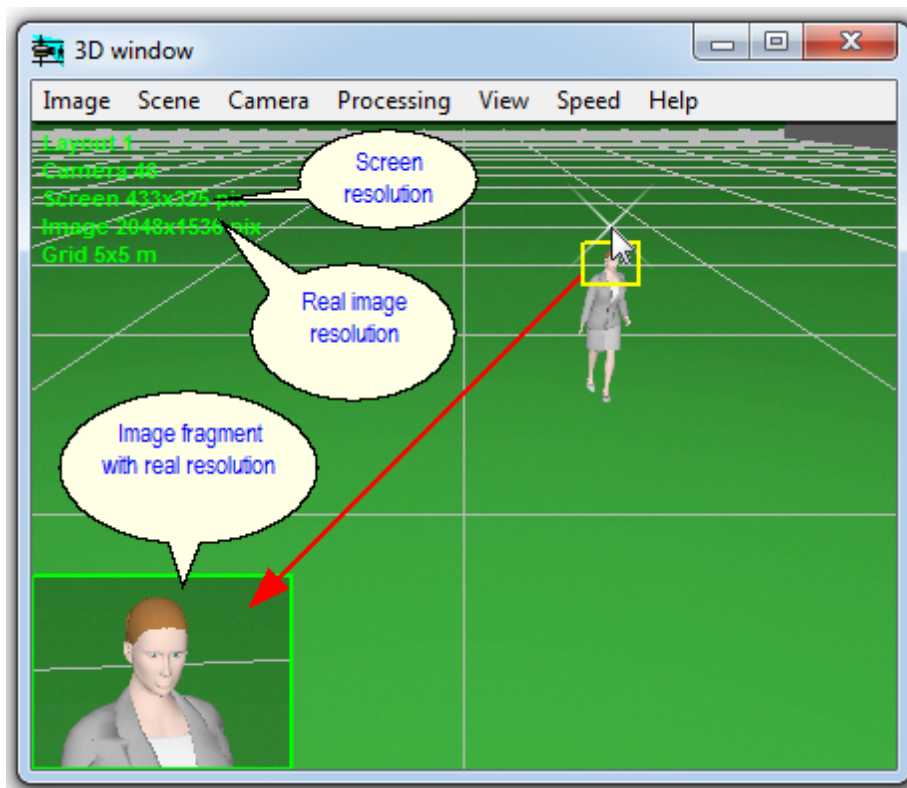
- Model luminaires considering spectrum of radiation and spectral sensitivity of image sensors, including discharge lamps with complex spectrum and infrared LED illuminators.



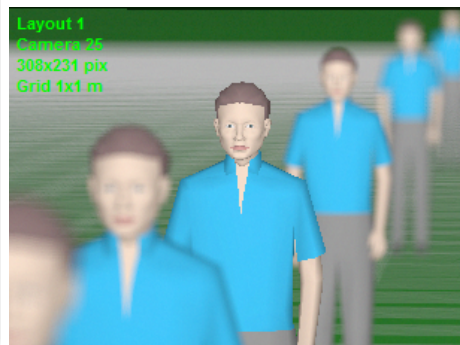
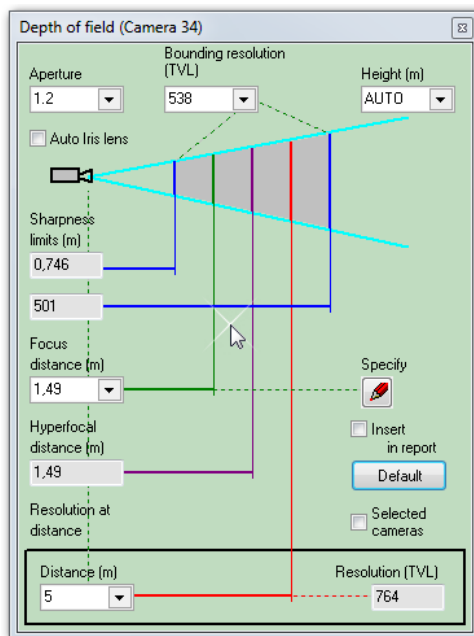
- Model camera parameters (spectral response, number of pixels (including [megapixel cameras](#) ^[237] with resolution exceeds screen resolution), resolution, minimum illumination at known signal/noise ratio, IRE and aperture, maximum signal/noise ratio, electronic shutter, AGC, BLC, gamma, day/night cameras, frame rate, interlace, global shutter and rolling shutter).

- Model lens parameters (focal length, aperture, auto iris DC and Video Drive).

- Model images from [megapixel cameras](#) ^[237] with resolution exceeds screen resolution (Up to 100 megapixel and more!).

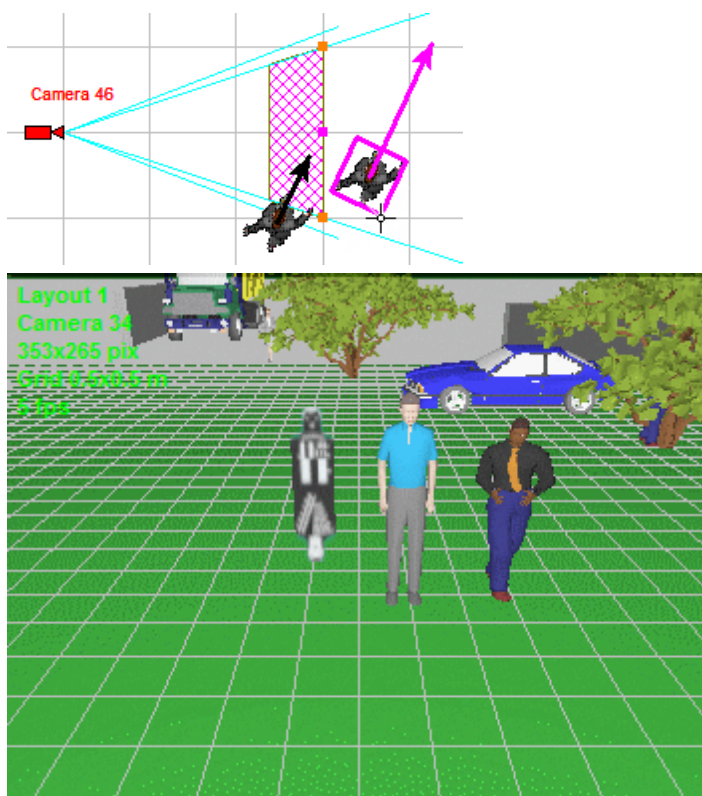


- Calculate and model depth of field of each camera in project.

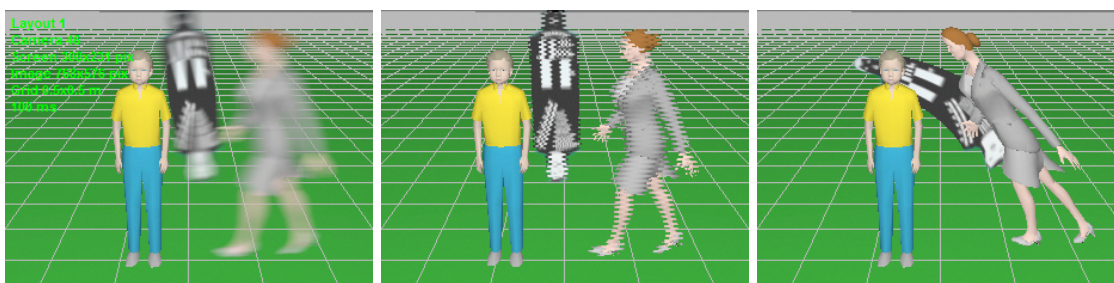


- Model DVR parameters (brightness, contrast, compression, horizontal and vertical sharpness).
- Obtain [Image Model](#)¹⁶⁹ for each camera in the project based on models of scene and equipment. This image can be printed and saved.

- Model [moving objects](#)^[81], camera [frame rate](#)^[238], create animated images with moving 3D models.



- Model [blur and distortion](#)^[243] of moving 3D models depending on camera parameters.



- Create [animated monitor models](#)^[239] as html files with moving 3D models and different frame rates of each camera.
as html files with moving 3D models and different frame rates of each camera.

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Part

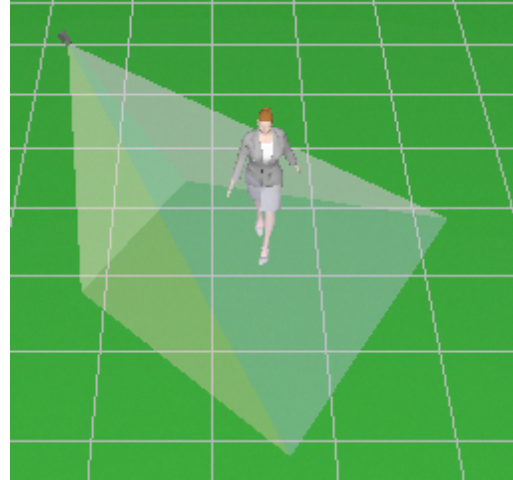
IV

Definitions

4 Definitions

Camera view area

A dimensional figure in shape of a convex tetrahedral angle with a vertex abutting a **camera lens** and a bisector, coinciding with the **main optical axis** of a **camera lens**. Angle edges form the **view area edges**. Any object within a view area will be displayed on the screen, **if it is not shaded by other objects on the scene**.

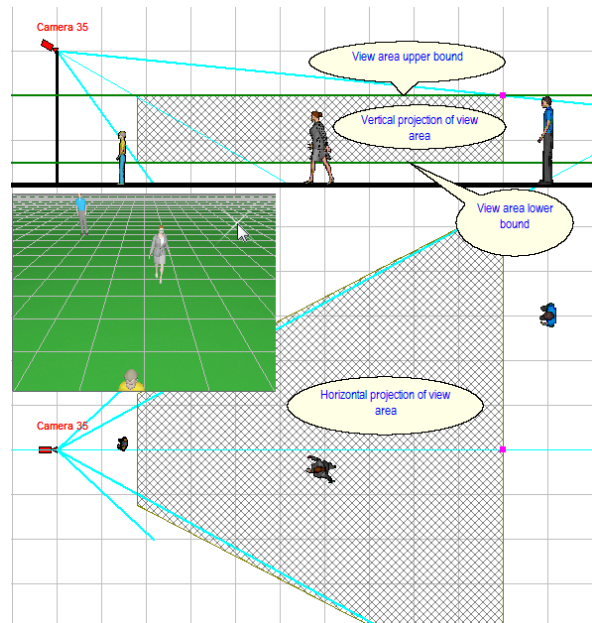


View area projections

Projections to horizontal and vertical planes of a view area part, which is residing between the **view area upper**^[155] and **lower bounds**^[155] specified in **parameters**^[152] in the **Camera Geometry box**^[150].

View area horizontal projection is calculated according to the rule:

*A point on the horizontal projection is considered visible if a vertical segment, formed by this point in the range of heights from the **view area lower bound height**^[155] to the **view area upper bound height**^[155], is visible wholly.*



Camera field of view

A rectangle limited by view area bounds and residing in a plane, perpendicular to the **main optical axis** of camera lens.

Camera tilt angle

A calculated parameter and can not be edited. The camera tilt angle is an angle between the **main optical axis** of camera lens and a **horizontal**.

Though in most of the cases the camera tilt angle is not interesting to designer, VideoCAD is

displaying it for information.

Background

It is a **prepared horizontal site plan** in any of the following formats:

- *.bmp - a bitmap (e.g., the layout scanned from a paper copy);
- *.dxf - AutoCAD format (created in AutoCAD or other program supporting export to *.dxf);
- *.dwg - AutoCAD format (created in AutoCAD or other program supporting export to *.dwg);
- *.jpg, *.png, *.gif, *.tif - the compressed image (e.g., a digital picture of the plan, scanned image);
- *.wmf, *.emf, *.emf+ - Windows Metafile (export to *.wmf is supported by the majority of the Windows graphics applications).

Compatiability with AutoCAD versions

VideoCAD 7.1 can use files of the following CAD formats as a background:

- *.dxf AutoDesk DXF Release 12, 13, 14 , 2000, 2002, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012.
- *.dwg AutoDesk DWG Release 12, 13, 14 , 2000, 2002, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012.

Software protection on USB Dongle basis (applied for VideoCAD Lite and VideoCAD Professional)

The program is operable on any computers to which port the dongle is connected. So you can carry the program from computer to computer, modernize computer, etc.

Only for **VideoCAD Lite**, for your convenience there is a possibility to register the program with the tie to you computer parameters one time. So you can start using the program before the dongle delivery.

With **VideoCAD Professional**, the registration with HID (locking to hardware parameters) is impossible.

The dongle should be connected to the USB port of you computer.

You can get more information on USB dongles in the [USB dongle](#)^[27] topic.

Software protection on HID identifiers basis (applied for VideoCAD Lite only)

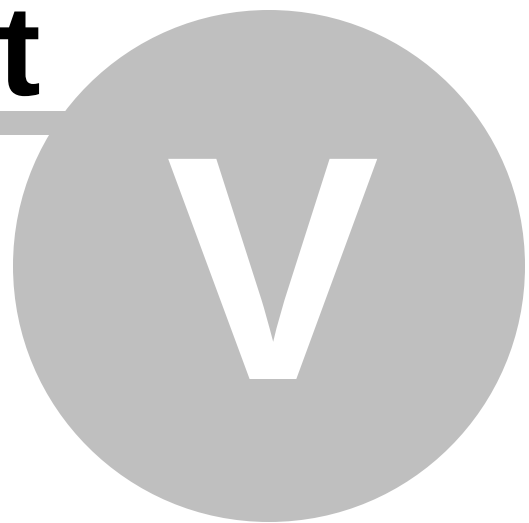
*With **VideoCAD Professional** the registration with HID is impossible.*

The registration is realized with the tie to your computer parameters. After computer change, hard disk formatting or other serious upgrade you will need a **reserve registration**.

Although the number of reserve registrations is limited to two, the registration counter cleaning is regularly realized. So you won't lose the purchased program in any case. If you spend all reserve registrations before the registration counter cleaning, you will have to wait for the next registration counter cleaning to continue using the program.

You may exchange the variant on the HID protection to the variant with the dongle protection, paying in addition for the cost of the dongle and delivery.

Part



What's new in VideoCAD

5 What's new in VideoCAD

[What's new in VideoCAD 7.1](#)^[45]

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7.1 What's new in VideoCAD 7.1

7.1.1 The import module of AutoCAD *.dxf, *.dwg files was updated. All DXF and DWG versions **up to AutoCAD 2012** are supported now.

7.1.2 In versions **VideoCAD Lite** and **VideoCAD Starter** earlier locked tools from version **VideoCAD Professional** were opened:

- [Rotakin](#)^[101] (without modeling rotation);
- [Modeling number of pixels](#)^[172] of the image in the 3D window;
- Modeling [JPEG compression](#)^[171] in the 3D window.

7.1.3 In version **VideoCAD Starter** earlier locked tools from version **VideoCAD Lite** were opened:

- [3D models](#)^[98] from version Lite (people, trees, cars etc.);
- Possibility of import 3D models and scenes from **Google SketchUp** and **Autodesk 3ds MAX**;
- [Copy](#)^[89] and [Paste](#)^[89] of constructions and cameras;
- Loading [background](#)^[111] in **AutoCAD *.dxf** and ***.dwg** formats;
- Displaying [examples of images](#)^[163] in the **Spatial resolution box** (resolution only);
- Modeling images from cameras [turned by 90 degrees](#)^[154];
- [Saving the drawing](#)^[110] in the Graphics windows with **resolution exceeding Windows screen resolution**;

7.1.4 Default values of Light efficiency and LED efficiency factor of LEDs were upgrades according to parameters of modern LEDs.

7.1.5 [A Car image with license plate](#)^[163] was added to the **Spatial resolution box**.

7.1.6 Detected errors since release of VideoCAD 7.0 were corrected.

7.1.7 The help system was upgraded.

7.1.8 Upgrade from versions VideoCAD 7.0 (Starter, Lite, Professional) is offered free of charge.

Upgrade from earlier versions is performed by [rules of upgrade](#)^[55] to VideoCAD 7.0.

7.1.9 The **VideoCAD Starter Kit** is released. It is a kit of three programs at the special price, including:

- [VideoCAD Starter](#);
- [IP Camera CCTV Calculator](#);
- [VideoCAD Plugin for Google SketchUp](#).

7. What's new in VideoCAD 7.0

NEW PROJECT FORMAT

7.1 New project file format ***.vc7**. There are possibilities of [export](#)^[108] and [import](#)^[108] of the previous project format ***.vmp**, supported by versions from 4 to 6.

7.2 Unlimited quantity of cameras in one project. In the previous versions each project could

contain no more than 100 cameras.

7.3 Unlimited quantity of constructions on each layout. In the previous versions each layout could contain no more than 5000 constructions.

7.4 Quantity of [line types](#)^[186] is increased to 2000.

SPEED OPTIMIZATION

7.5 Resource-intensive operations are allocated in separate threads. This allows working in the graphics window without delays and also get considerable gain in efficiency on modern multicore processors.

7.6 [3D image](#)^[169] generation is allocated in a separate thread. This allows working in the graphics window with opened 3D window without delays for redrawing 3D images. The priority of the 3D window thread can be [switched](#)^[192]. During image generation in the 3D window on the [3D window button](#)^[86] blinking red frame appears.

7.7 New items were added to the 3D window's main menu: Speed>[Disable image processing](#)^[171] and [Update image only by clicking](#)^[171]. These items duplicate the same items in the Options box. When image processing is disabled the 3D image redraw speed considerably increases.

7.8 Possibility of [two-stage image generation](#)^[192] in the 3D window. At the first stage the image without processing is quickly generated and displayed. Then resource-intensive per-pixel processing is carried out and the processed image is shown.

7.9 In the [PTZH frame](#)^[172] mode image processing is disabled to increase speed of image redrawing. Titles are disabled too.

7.10 The algorithm of modeling sensitivity of megapixel cameras is accelerated.

7.11 Image redrawing in the Graphic window was accelerated too. Bottlenecks were optimized.

CALCULATING SHADOWS IN THE VIEW AREA

7.12 Constructing horizontal projection of camera control area taking into account [shadows](#)^[81], arisen from obstacles on the scene environment. In three dimensions, shadows from any constructions (including 3D models) can be automatically calculated and displayed.

7.13 New definitions are introduced: Camera control area and Control area projection.

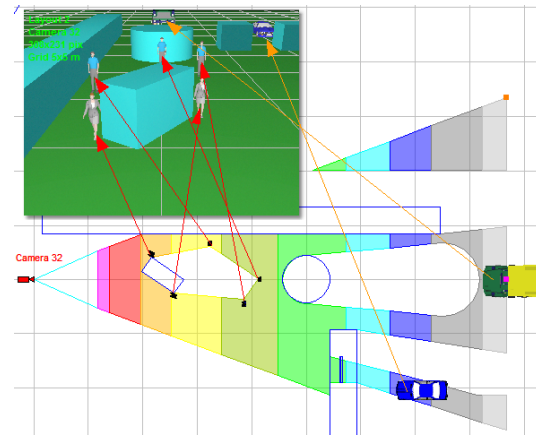
Camera control area forms by subtracting shadows of environment objects (uncontrolled areas) from [camera view area](#)^[41].

7.14 Constructing the Camera control areas of [PTZ](#)^[242](dome) cameras taking into account shadows, created by obstacles on the scene environment. The tool is also useful for choosing the best location for fixed cameras to make reachable required areas.

7.15 In the Line type properties there is new item: [Shadow](#)^[186]. If the item is checked then all constructions made by this line type are considered as obstacles at calculating shadows.

7.16 On the Current construction parameter panel when a 3D model is editing, there is additional checkbox- [Shadow](#)^[147]. If the checkbox is checked, then the 3D model is considered as an obstacle at calculating shadows.

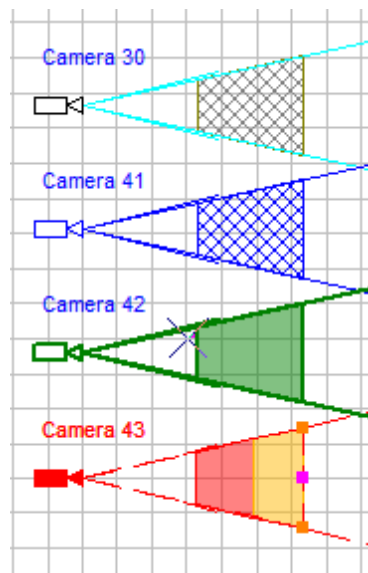
Shadows - a new powerful yet easy-to-use tool of VideoCAD 7. Shadows are calculated for all positions of cameras, shading objects can be located at any point of space. You should only enable calculation of shadows.



COLORS, FILLING AND HATCHING OF VIEW AREA PROJECTIONS

7.17 View area projection of different cameras can have [different color](#)^[83] according to parameters of line type of these cameras (in case of disabled [spatial resolution](#)^[84] visualization).

7.18 View area projection can be semitransparent. The [Fill projection](#)^[83] button and corresponding item of the main menu have a drop-down list in which it is possible to choose blend filling or hatching view area projection.

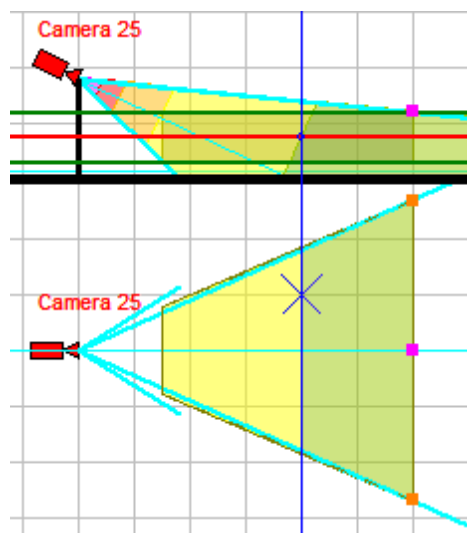
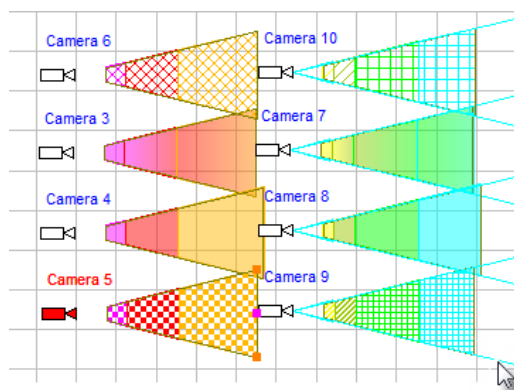


VISUALIZATION OF SPATIAL RESOLUTION AND FIELD OF VIEW SIZE

7.19 Camera view area can be divided into [regions](#)^[84] filled by different color and (or) type of hatching. Regions can differ depending on the following criteria:

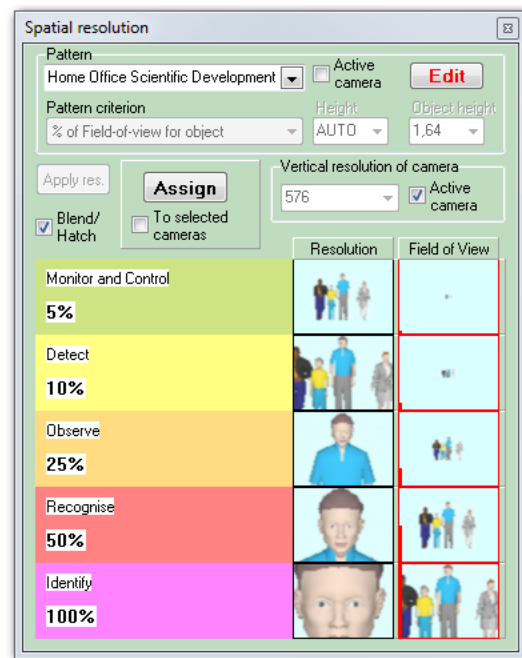
- spatial resolution (pixels/meters, pixels/foot);
- vertical field of view size (meter, foot);
- vertical number of pixels covered by an object of the specified height (meter, foot);
- the part of the frame (%) covered by an object of the specified height (meter, foot).

7.20 The spatial resolution is measured at the specified height and can be displayed in the Horizontal projection in all modes. In the Vertical projection the spatial resolution is displayed in the loaded (active) camera editing mode only.



7.21 The new [Spatial resolution box](#)^[158] was added in which it is possible to create and edit patterns of spatial resolution and field of view size visualization. In the box there are prepared spatial resolution patterns according to the following criteria: Home Office Scientific Development Branch, Home Office Guidelines for identification, P 78.36.008-99. Also in the box there are examples of images of group of people are automatically displayed for each region of spatial resolution. Different patterns can be assigned to different cameras.

7.22 View area projections can have [gradient colors](#)^[84]. In this case key colors of the gradient correspond to the colors in the assigned pattern from the Spatial resolution box.

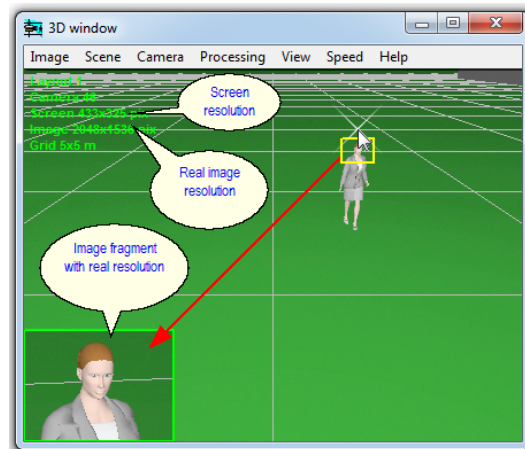


MODELING RESOLUTION OF MEGAPIXEL CAMERAS

7.23 On the Image parameter panel a new tab PiP (Picture in Picture) was added. The PiP mode allows to model in the 3D window images with resolution exceeding the 3D window resolution and even the resolution of the Windows screen.

7.24 Digital ZOOM in the PiP mode allows to additionally magnifying specified area on the 3D window for detailed analysis.

7.25 If the image resolution differs from the 3D window size and artificial decrease of resolution is performed or the PiP is displayed, in the [Titles](#)^[169] of the 3D window in separated lines the image resolution and the screen resolution are displayed.



7.26 New values of resolution in the drop-down lists. Lists of resolution are stored in files H_res.txt and V_res.txt in the VideoCAD installation directory. To add new resolution it is possible to edit these files. As well as in the previous versions you can type any resolutions by the keyboard.

MODELING MOVEMENT

7.27 You can specify speed and direction of movement for [3D models](#)^[81] in a velocity vector form and in a numerical form.

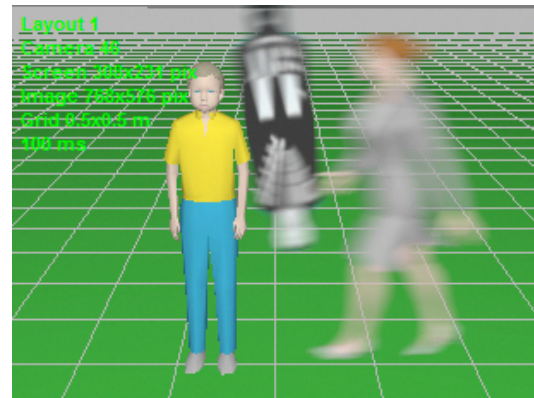
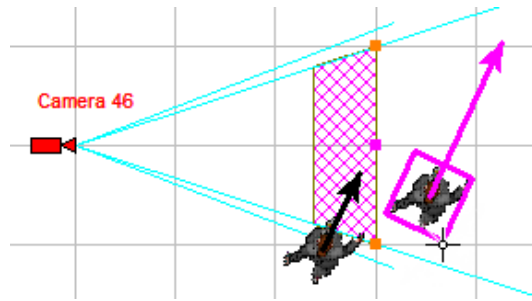
7.28 On the Current construction parameter panel when choosing 3D models there is an additional [Speed](#)^[147] box.

7.29 Frame rate was added to the camera parameters.

7.30 It is possible to model movement of 3D models and rotation of the [Rotakin](#)^[101] object.

7.31 [Visual estimation](#)^[238] in the Graphics window how many times moving object will get into the frame, depending on speed and direction of movement of the object, location and frame rate of the

camera and the view area form.



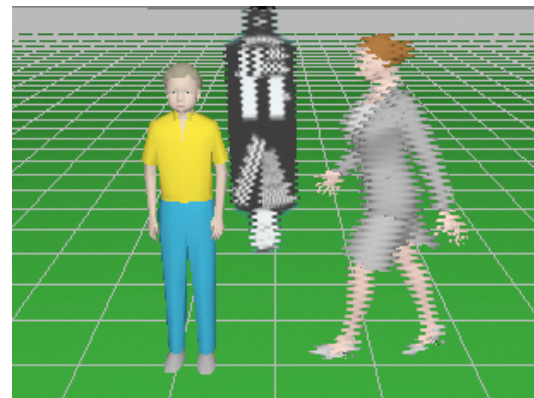
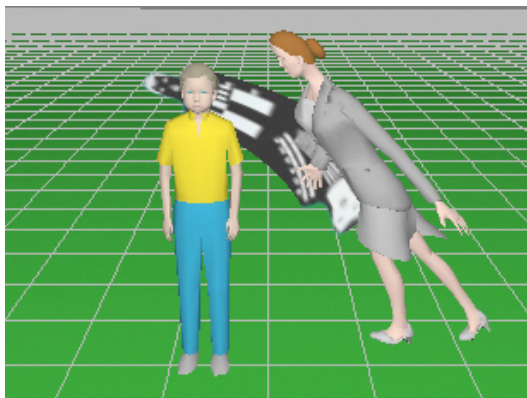
7.32 Exposure time and Row time of Rolling shutter were added to camera parameters.

7.33 It is possible to model blur of moving 3D models (motion blur) and rotating Rotakin depending on the speed, direction of movement and exposure time of camera.

7.34 When modeling exposure time in the 3D window Titles current exposure time value is displayed.

7.35 Modeling [distortions](#)^[243] of moving 3D models and rotating Rotakin from Rolling shutter and Global shutter.

7.36 Modeling [interlace distortions](#)^[243] of moving 3D models and rotating Rotakin.



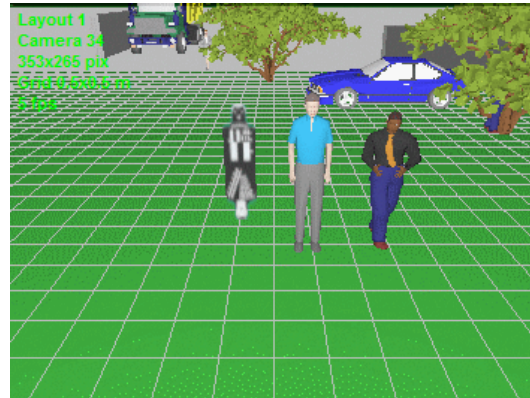
CREATION OF ANIMATED IMAGES

7.37 Possibility of creation of animated images with moving 3D models.

7.38 On the Image parameter panel, View tab the Number of frames box was added.

7.39 When the Number of frames is more than one, in the 3D window's [titles](#)^[169] the Frame rate value is displayed and in the 3D window animated image with specified Frame rate is generated.

7.40 Animated images can be [saved](#)^[171] as animated GIF files and displayed on the Monitor window.



[See an example of animated monitor \(file size about 4 Mb\).](#)

NEW IN THE MONITOR WINDOW

7.41 Scaling the Monitor window in Windows 7 was improved.

7.42 New [sizes](#)^[177] of monitors were added.

7.43 Possibility of setting [resolution](#)^[178] of digital monitors.

7.44 During loading monitors it is possible to interrupt the long operation, having pressed ESC.

7.45 It is possible to set [correcting factor](#)^[198] for exact modeling physical sizes of monitors.

7.46 Displaying on the monitors [animated](#)^[176] images with moving 3D models.

7.47 [Saving](#)^[179] image of the monitors in formats *.gif, *.tif, *.png.

7.48 Exporting images on the monitors to the [*.html](#)^[179] file with static or animated images. Camera's images are saved in the camera's original resolutions in the form of separate files PNG or animated GIF.

[See an example of animated monitor \(file size about 4 Mb\).](#)

NEW OBJECTS AND TOOLS

7.49 New object - [Rotakin](#)^[101] - an animated rotating test target for visual estimation of spatial resolution and motion distortions on the 3D images. In the Options box it is possible to change rotation speed of the Rotakin.

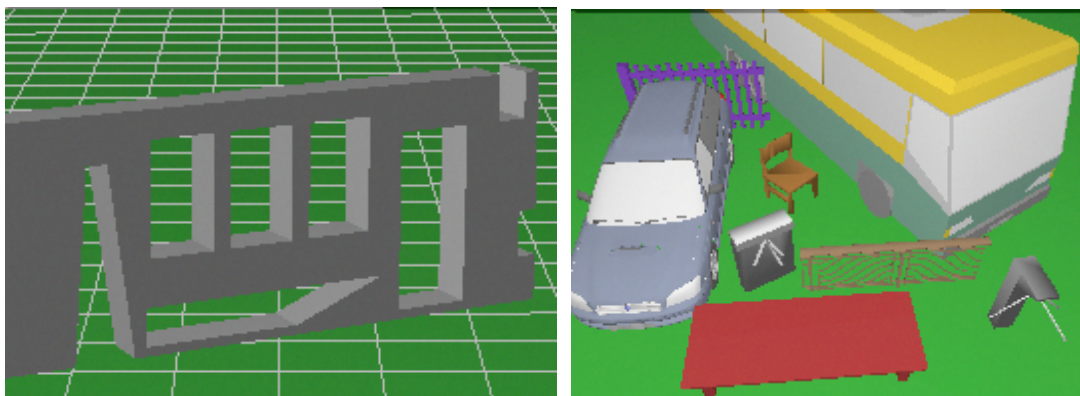
7.50 New object - [Wall](#)^[95]. It allows drawing walls with different thickness.

7.51 New object - [Aperture in Wall](#)^[96]. It allows making in 3D walls any apertures, for example for windows and doors.

7.52 New object - [Polyline](#)^[92]. It allows drawing line segments continuously.

7.53 New tool - [Scale](#)^[90]. It allows scaling selected constructions relative to a base point.

7.54 New tool - [Mirror](#)^[90]. It allows getting mirror copies of selected constructions relative to a horizontal or vertical line.



7.55 Existing Copy and Cut tools are renamed to [Copy with base point](#)^[134] and to [Cut with base point](#)^[133].

7.56 New [Copy](#)^[89] and [Cut](#)^[89] tools were added. In the new tools the base point is set automatically at the center of copied objects.

7.57 Several new [3D models](#)^[98] were added to the library.

CABLE REPORT

7.58 Possibility of using in the project a lot of brands of cables. [Line types](#)^[186] can be considered as cables.

7.59 Possibility of drawing main cables, which is not associated with cameras.

7.60 Possibility of getting the [Cable report](#)^[246]. The report contains lengths of all cables separated by brands and cameras, including the main cables.

7.61 Continuous drawing [cables](#)^[137]. The end of each segment is the start of the following one. To stop drawing cable press ESC.

DEPTH OF FIELD IN THE HORIZONTAL PROJECTION

7.62 The Height parameter was added to the depth of field parameter list. At the set Height the analysis of depth of field is performed do display the depth of field bounds in the Horizontal projection. The height can be different for different cameras.

7.63 When the Depth of field box is opened, all cameras in the horizontal projection have displayed borders of the sharpness area, hyperfocal distance, focus distance measured at the set height. In the vertical projection the borders of the sharpness area, hyperfocal distance, focus distance are displayed in the loaded (active) camera editing mode.

7.64 It is possible to specify focus distance by clicking on the view area horizontal projection of the loaded (active) camera. The Specify focus plane button is always accessible.

7.65 When the Specify focus plane button is pressed, during cursor movement over the view area horizontal projection of loaded (active) camera, on the [Status bar](#)^[142] the resolution under the cursor limited by the depth of field is displayed.

7.66 In the Depth of field box the new Default button was added. As a result of clicking this button, default values will be assigned to input parameters in the Depth of field box: the boundary resolution = 0.7*horizontal pixel count, focus distance = hyperfocal distance, height = AUTO (middle height of the camera's view area).

NEW IN TABLE OF CAMERAS AND TABLE OF CAMERA MODELS

7.67 A new menu for switching visibility of separate columns was added.

7.68 Several new possibilities of filtering data in the tables.

7.69 Several new parameters of camera model were added: Exposure time at measuring sensitivity, Maximal frame rate, Row time (parameter of the Rolling Shutter).

7.70 To the Table of cameras these three new parameters of model were added and in addition: Current frame rate, [Name of the assigned Spatial resolution pattern](#)^[158], [Signal cable brand](#)^[205] and [Power cable brand](#)^[206].

INTERFACE IMPROVEMENTS

7.71 Possibility to [adjust](#)^[197] visibility of buttons on the Tool bar.

7.72 When [Alt is pressed](#)^[148], it is possible to move drawing in the Graphics window using arrow keys and to change scale using plus and minus keys irrespective of the input focus.

7.73 In the PTZH frame mode of the 3D window you can pan and tilt the camera by moving the image in the 3D window with left mouse button pressed like moving drawing in the Graphics window.

7.74 In the Options box the [Default](#)^[185] button was added. Using this button you can assign default values to all parameters on the opened tab.

7.75 Sign of the [Scaling factor when turning the mouse wheel](#)^[198] in the Option box determines the reaction for direction of rotation the mouse wheel in the Graphics window.

7.76 Manual scaling 3D window in Windows 7 was improved.

7.77 On the Processing tab of the Image parameter panel and in the Sensitivity and resolution box between combo boxes with horizontal and vertical numbers of pixels, new buttons with a cross were added. These buttons are intended for fast calculation of vertical number of pixels from the specified horizontal number of pixels and on the contrary. Calculation is carried out using the [Aspect Ratio](#)^[154].

7.78 On the View tab of the Image parameter panel near to a box with the horizontal number of pixels, the calculated value of vertical number of pixels and the Aspect ratio are displayed.

7.79 At the left top corner of the Tool bar the [Save project](#)^[81] button was added for convenient regular saving the current project to a file.

7.80 Links to the last 10 used project files are accessible in the Main menu>[Project](#)^[107].

7.81 Accuracy of 3D model selection in the Graphics window was improved.

7.82 In the Main menu>[Help](#)^[139] new items with links to our web site and VideoCAD user forum in the Internet were added.

UNDO

7.83 Buffer of last operations (UNDO) stores now all parameters of cameras.

7.84 Depth of the undo buffer can be adjusted on the [Miscellaneous](#)^[198] tab of the Options box. This depth can be up to last 50 operations.

7.85 The [REDO](#)^[104] button was added for moving in the UNDO buffer in the opposite direction.

NEW FORMATS OF IMPORT AND EXPORT

7.86 Support of import as [background](#)^[111] and [export](#)^[110] drawing in the following formats: EMF +, GIF, TIFF, PNG. Blend color and gradient color are supported.

7.87 Support of export drawing to JPG format (Import of the JPG format is present in the previous versions).

7.88 Possibility of [saving](#)^[171] image from the 3D window in formats: GIF, animated GIF, TIF and PNG.

7.89 Possibility of [saving](#)^[179] image from the Monitor window in formats: GIF, TIF, PNG, HTML with PNG, HTML with animated GIF.

CHANGES

7.90 When editing by points a [rectangle](#)^[93], an [inclined rectangle](#)^[94] or [3D image](#)^[100], the rectangle remains rectangular by default. By pressing Ctrl it is possible to edit separate points and to change distance between lines. In the previous versions it was on the contrary.

7.91 [Double line](#)^[94] rotates as a whole, with keeping distance between lines that is more convenient at construction of walls.

7.92 When editing by points a double line, it rotates as a whole by default. Keeping Ctrl it is possible to edit separate points and to change distance between lines. In the previous versions it was on the contrary.

7.93 The Post in the 3D window is hidden by default. It is possible to show post on the View tab of the Image parameter panel.

7.94 Setting of export to raster formats on the [Export](#)^[195] tab of the Options box by default correspond to an exact copy of the screen.

7.95 At the moment of closing the Image parameter panel the According to camera parameters box on the Processing tab becomes marked automatically and all parameters on this tab get values from the loaded (active) camera. This is to avoid mess with displaying resolution of loaded (active) and inactive cameras.

7.96 Name of the loaded (active) camera is not red colored when exporting and printing.

7.97 When modeling interlaced fields, the vertical resolution of video sensor (if it is set) decreases twice. In the previous versions the vertical resolution of the whole image in the 3D window was decreased.

7.98 From the Camera tab of the Image parameter panel duplicating controls are removed to clear a place for new tools. The controls remain on the Sensitivity and resolution box.

RENAMINGS

7.99 The **Loaded camera** term is changed to the **Active camera**.

7.100 Menu item Project> Export is renamed to Project> [Export to text](#)^[107].

7.101 Button **Actual view area projections** and the corresponding Main menu item are renamed to [Fill projections](#)^[83].

7.102 The **Interface** tab in the Options box is renamed to [Miscellaneous](#)^[198].

7.103 Coaxial cable is renamed to the Signal cable (the Russian version).

UTILITIES

7.104 Utilities for measuring camera and image parameters were separated out from VideoCAD in the separate product - **CCTVCAD Lab Toolkit**.

7.105 Utilities in the **CCTVCAD Lab Toolkit** become more stable in Windows 7.

7.106 The Video analyzer has a possibility of automatic measuring signal/noise ratio of static image or live video on the computer screen, in a window of any third party program.

7.107 In the Image analyzer, showing separate image lines as a oscilloscope can be separated by color.

7.108 In the Spectrum analyzer, a possibility of calculating spectral efficiency of infra-red LEDs of different wavelength for different image sensors was added.

7.109 In the Spectrum analyzer, spectral sensitivity curves of modern CMOS and CCD megapixel image sensors (SONY, Cypress, Micron) were added.

7.110 The [technique of measuring sensitivity](#)^[226] of cameras was refined on the base of practice of measuring the sensitivity of **IP cameras**. A new method of measuring the sensitivity using the Video analyzer was added.

7.111 Procedures for measuring camera [exposure time](#)^[249] and the [row time of rolling shutter](#)^[252] of IP cameras were developed.

MISCELLANEOUS

7.112 Possibility to make camera and luminaries icons scalable together with the other constructions on the drawing. In this case the size of icons is specified in meters (feet). This possibility allows setting the exact sizes and positions of icons and names of cameras for exporting and printing.

7.113 Possibility of assigning [scalable fonts](#)^[188] to the camera names and specifying displacement of camera names in meters (feet) for scalable icons and in pixels for no scalable icons separately.

7.114 Displaying background in the 3D window was improved.

7.115 A new possibility of adjusting [resolution](#)^[193] of a vector background (in AutoCAD format) in the 3D window.

7.116 In the Options box on the 3D tab a slider was added which allows adjusting [realism of modeling](#)^[192] depth of field, exposure time and rolling shutter.

7.117 In the Sensitivity and resolution box a new camera parameter Exposure time at measuring sensitivity was added.

7.118 In the [exporting text file](#)^[107] for each camera the following information was added: Horizontal angle of camera, Coordinate X, Coordinate Y, Model, Producer and Cost.

7.119 In the [Camera list](#)^[200] box new parameters were added: lens focal length and vertical number of pixel. Now you can copy the camera list to the Windows clipboard to paste in **MS Excel**, **MS Word** and other software.

7.120 Help system was considerable improved; a lot of pictures were added.

7.121 [Examples of work with VideoCAD](#)^[213] in the Help were updated according to the new features. Several new examples were added.

7.122 Program was adapted for modern wide-screen monitors with high resolution.

7.123 Program was tested under Windows 7. Detected incompatibilities are eliminated.

RULES OF UPGRADE

7.124 The Rules of upgrade from previous VideoCAD versions to VideoCAD7:

- For the customers who have purchased VideoCAD6 (or upgraded to VideoCAD6) after **01 January 2011** upgrade cost makes a difference between cost of VideoCAD7 and VideoCAD6.
- For the customers who have purchased VideoCAD6 (or upgraded to VideoCAD6) before **01 January 2011** updating cost makes half of the VideoCAD7 cost.
- For the customers who has VideoCAD3..VideoCAD5 and didn't upgrade to VideoCAD6, updating cost makes 3/4 of VideoCAD7 cost.
- Upgrade Lite version to Professional is paid in addition.
- For the customers, whose original valuable suggestions have found application in VideoCAD 7.0, the additional discount for upgrade is given.
- **VideoCAD 7 Professional** can work **only with USB Senselock**^[272] **dongle**. HID registration with the Professional version is not applied. Senselock dongles from VideoCAD 6.XX are supported. In case of absence of USB Senselock dongle it is necessary to purchase it. Guardant dongles are not supported by VideoCAD 7.0.
- **VideoCAD 7 Lite**^[17] can work with [USB Senselock dongle](#)^[271] and with the HID registration.
- **VideoCAD 7 Starter**^[29] is registered only by personal registration code, without dongle, without hardware locking.



6.1 What's new in VideoCAD 6.1

6.1.1 [VideoCAD Lite](#)^[17] is released. VideoCAD_Lite is an inexpensive version of VideoCAD with limited features. VideoCAD_Lite offers only the most useful and easy-to-master tools for CCTV

design.

6.1.2 A new possibility to assign any model to [all selected cameras](#)^[81] simultaneously

6.1.3 A possibility to change the following parameters of [all selected cameras](#)^[150] simultaneously: lens focal length, image sensor format, installation height, parameters of view area, quality level.

6.1.4 Exposure time range is expanded up to 1 sec. for convenience in modeling modern IP cameras with increased exposure time.

6.1.5 [Line color in the 3D window](#)^[186] is displayed on the [Line type panel](#)^[144].

6.1.6 Changing Number and Model Name is disabled on the Used models tab in the Table of camera models. Earlier such changes resulted in loss of the model from the model list.

6.1.7 If size of video sensor is standard, at closing the [Special sensor size](#)^[157] box, the standard designation of the sensor size is kept.

6.1.8 The Help system is updated.

6.1.9 VideoCAD installer is updated.

6.1.10 Found bugs are fixed: running under a user account, error at starting VideoCAD by double clicking on a project file, an erroneous message ' Your graphics card does not support this tool ', directory path of jpg images saving is not kept, error at editing text on the drawing.

6.1.11 Updating from VideoCAD 6.0 is offered free-of-charge. Updating from earlier versions is performed according to [rules](#)^[61] of updating up to VideoCAD 6.0.

6. What's new in VideoCAD 6.0

IIIUMINATION AND LUMINARIES

6.1 Modeling background scene illuminantion, considering type and direction of light source, separately for day and nighttime.

6.2 [Luminaries](#)^[81] modeling considering lamp type and light efficiency, including discharge lamps with complex spectrum of radiation.

6.3 Different wavelength Infrared LED illuminators modeling.

6.4 Illuminator calculation box for creating luminaire models and calculating their parameters.

CAMERA, LENS AND DVR PARAMETERS

6.5 Camera parameters modeling (spectral response; number of pixels; resolution; minimum scene illumination at known signal-to-noise ratio, IRE and aperture; maximum signal-to-noise ratio; electronic shutter; AGC; Back Light Compensation; gamma correction).

6.6 Lens parameters modeling (focal length; aperture; Auto Iris DC and Video Drive). Calculating and modeling Depth of field based on calculated aperture.

6.7 Modeling cameras, switching into black and white mode in case of low illuminance: day/night with removable IR filter and easy day/night with permanent IR filter.

6.8 Enhanced modeling of DVR parameters (vertical and horizontal digitization, brightness, contrast, compression, vertical and horizontal sharpness).

6.9 Modeling specific distortions which are arisen as a result of mismatching output image size and number of pixels on camera's video sensor.

6.10 Modeling images based on scene, lens, camera and DVR models. Calculating and modeling signal-to-noise ratio and contrast.

6.11 Image models at different illumination levels are [tested](#)^[226] against **real video cameras**. Very high level of coincidence has been achieved.

UTILITIES

6.12 Image analyzer tool allows measuring signal-to-noise ratio, brightness and brightness amplitude of an image, size and contrast of an object relative to background, building histogram, calculating image size at different compression levels, analyzing certain lines of an image similarly to oscilloscope, as well as modifying certain image parameters. By analyzing saved images using this tool it's possible to calculate sensitivity and resolution of a real camera for precise modeling in VideoCAD.

6.13 Live video analyzer tool allows measuring brightness, average brightness and noise in certain point, as well as screen frame rate in window containing live video created by any program.

6.14 Lamp spectrum analyzer tool allows to determine the spectral efficiency of any light source for various camera types based on spectral power distribution curve. Determined value of spectral efficiency is used in VideoCAD for precise modeling various types of light sources.

CAMERAS

6.15 Table of camera models support (over 100 parameters for each model), ability of assigning models for project cameras. It's possible to adjust a view of model table by hiding unnecessary columns. Table of models supports sorting and filtering. Automatic calculation of sums of power consumption and prices. Ability of printing tables and their parts, importing and exporting into Excel, Word, *.txt, *.csv, *.htm.

6.16 Modern IP cameras support ([16:9 Aspect Ratio](#)^[157], different image sensor sizes and aspect ratio, high image resolution).

6.17 **Criteria in Quality levels** concerned with limiting image resolution (maximum vertical field of view size, minimal parts of screen occupied by a license plate and a face) are related to the number of pixels for modeling and comparing digital cameras with different resolution. These criteria are now known as: Minimal vertical resolution (pixel/meter), Minimal vertical size of face image (pixels) and Minimal vertical size of license plate image (pixels).

6.18 **Varifocal and ZOOM lens** support. [Adjusting](#)^[153] lens focal length by moving view area bound on a layout within set limits using a mouse.

6.19 Icons for internal, outdoor and PTZ cameras may be [different](#)^[81].

6.20 For each camera icon by various [line types](#)^[81] can be set. Thus, the camera icons can vary in color and line thickness.

6.21 Lens [focal length](#)^[153] range has been widened to 1000mm.

IMPORT AND EXPORT

6.22 A [background](#)^[111] in *.dwg AutoCAD™ 2007 format support, AutoCAD™ PROXY records support, loading speed of complex *.dxf files is improved. Bug fixed. All ANSI code pages support, and other improvements concerned with *.dxf and *.dwg files import.

6.23 [Export](#)^[195] to *.dxf file is improved. It's possible to set camera icons and illuminator size in AutoCAD™ units. Ability of exporting large background files.

3D MODELS AND 3D WINDOW

6.24 Several new [3D models](#)^[98] were added, including dark-skinned person for testing the ability of detecting dark-skinned people at low illumination.

6.25 3D models now can be [scaled](#)^[147] in any direction.

6.26 3D models can be placed in [vertical projection](#)^[98]. Models placed in vertical projection will not be visible in 3D window.

6.27 Convenient [3D model](#)^[80] selection from the tool bar.

6.28 [Raster images](#)^[100] in the 3D window. Usual photos and pictures in *.bmp or *.jpg format can be placed in 3D space. Raster images can be transparent, and can replace difficult-to-make 3D models. Raster images can be scaled, placed at any angle, used for modeling variety of objects, from banknotes and plates to a complex background.

6.29 **Background** can be visible in the 3D window.

6.30 [Redraw 3D image only by clicking](#)^[193] mode is convenient in case of complex scenes and/or slow computers, when image repainting in 3D window takes much time.

6.31 Fixed fuzzy drawing PTZH frame and titles in the 3D window when using certain video cards.

6.32 Image parameter panel with View, Scene, Camera, Processing tabs. Panel can be activated by right-click or double-click on the 3D window.

6.33 Setting visibility of different objects in the 3D window on View panel.

6.34 View, scene and equipment parameters are set individually for each camera. Quality levels no longer include 3D image parameters.

WINDOWS

6.35 Quality level box contains corresponding quality level criteria..

6.36 Sensitivity and resolution box with camera and lens parameters.

6.37 Camera parameter box has been renamed to [Camera geometry](#)^[150]. Inherited from older

versions unnecessary interface elements have been removed. Additionally, this box allows to change [aspect ratio](#)^[154], [image sensor sizes](#)^[157] and view angles.

6.38 Modeling [16:9](#)^[178] format monitors. Switching [day/night](#)^[176] illumination modes on the Monitor window.

6.39 Tab quantity in the [Options box](#)^[185] has been increased.

6.40 Model column has been added to the table in the [Camera list](#)^[200] box. Column width can be adjusted by the mouse. Icon box and Table of camera models button have been added to the Cameras list box.

6.41 Appropriate camera is loaded by double-clicking on the [Camera list](#)^[200] box. To rename camera use appropriate pop-up menu item.

6.42 Camera type box has been added to the [New camera](#)^[81] box. When creating new camera, line type can be chosen for it's icon on the [Line type panel](#)^[144].

REPORTS AS A TABLE

6.43 Interactive adjustable table reports including any camera parameter sets. Various types of tables can be formed by hiding unnecessary columns. Tables support sorting and filtering. Automatic calculation of sums of power consumption, cable lengths and prices. Ability of printing tables and their parts, importing and exporting into Excel, Word, *.txt, *.csv, *.htm. Convenient editing parameters by double-clicking on any cell.

TOOLS

6.44 A New Tool for automatic [name generation](#)^[202] and camera serial numeration on layouts. Various numeration templates and rules.

6.45 A New Tool for [counting length sum](#)^[208] of line segments of specified line type. Thus any line type can be used as a cable.

6.46 A New tools for switching draw order of constructions and cameras: [Cameras over constructions](#)^[117], [Bring to front](#)^[135], [Send to back](#)^[135]. These tools simplify work with complex 3D models of buildings, grass, etc., where another 3D models can be placed above (or inside) them.

6.47 [Show all](#)^[120] tool considers not only cameras, but the background and constructions as well.

6.48 [Change line type](#)^[136] tool can change icon line type of selected cameras.

6.49 In order to model windows and transparent objects, [inclined rectangle](#)^[94] in the 3D window can be transparent by 70%.

6.50 [Edit](#)^[146] button will appear on the Current construction parameters panel when drawing construction is complete. Click this button to edit last drawn construction.

INTERFACE

6.51 Assigning and editing [keyboard Shortcuts](#)^[190] for items in Graphics window main menu.

6.52 [Rotating cameras](#)^[75] in both planes by moving view area bound on the layout using the

mouse.

6.53 Adjusting [lens focal length](#)^[78] by moving view area bound on the layout using the mouse.

6.54 Loading and saving directories are stored. When recalling same operation stored directory is opened.

6.55 Horizontal and vertical **scroll bars** and scaling by + - keys to simplify work on portable computers.

6.56 [Tabs](#)^[141] in the Graphics window for fast switching, creating and deleting layouts. Layouts button has been removed from the Tool bar.

6.57 A [combo box](#)^[82] on the Tool bar for fast loading of any camera. Using pop-up menu of the combo box it is possible to search the camera on the layout.

6.58 A [combo box](#)^[81] on the Tool bar for fast assigning a model to the loaded camera.

6.59 Enhanced selecting and loading cameras on the layout using the mouse. Cursor snaps to a camera icon with higher priority, and it's highlighted with red rectangle.

6.60 Priority of mouse [selection](#)^[87] of close objects is presetted: 1. Cameras; 2. Constructions; 3. Text; 4. 3D models.

6.61 A New algorithm of [selecting constructions](#)^[87], located over each other. In order to select another construction it is necessary to click the same point again.

6.62 [Snap sensitivity](#)^[198] can be adjusted for convenient work with different screen resolutions and mouse accuracy. The snap to a camera has a priority.

6.63 Following info is displayed at the bottom of the Graphic window on the [Status bar](#)^[142] when moving cursor close to a camera icon: name, model name and basic parameters of the camera.

6.64 [Field of view size](#)^[81] on the Status bar in loaded camera edit mode now is displayed when moving the cursor over view area in vertical projection, not only when clicking.

6.65 [Move](#)^[89] mode is set after [creating new camera](#)^[81]. It's convenient to place new camera on the layout instantly.

6.66 **ESC** key stops current operation. If an operation is not performed, [Select/edit](#)^[87] mode is switched on.

6.67 Current [line type](#)^[186] is stored before placing 3D models, cameras and illuminators, and is restored after placing.

6.68 In case of editing [height](#)^[146] values on the Current construction parameter panel during drawing, new height value will be kept when drawing is complete. Other parameters of construction located on the Current construction parameters panel are kept as well.

6.69 Loaded camera icon's color is changed to red.

6.70 View>[All camera cables](#)^[117] and View>[Loaded camera cables](#)^[117] menu item states are not stored individually for each camera; they are stored in common project settings.

INHERITED ELEMENTS

6.71 Fast scaling mode by rotating pressed mouse-wheel is disabled due to inconvenience of work with certain mouse types.

6.72 Title button has been removed from the Tool bar. It is possible to show/hide [titles](#)^[117] using the main menu item.

6.73 Saving Resolution and Edit Image menu items have been removed from the Main menu. Resolution can be changed in the Options box on [Export](#)^[195] tab.

6.74 Measurement format by default box has been removed from the [Options box](#)^[185]. When creating new project, measurement format concurs with measurement format in the current project.

6.75 Layout combo box has been removed from the [New camera](#)^[81] box. The layout of creating camera always concurs with the current layout.

6.76 Camera>Save as item has been removed from the Main menu.

OTHER

6.77 VideoCAD Help system is now in **Html Help** format for compatibility with **Windows Vista**.

6.78 Help system has been redesigned taking into account user's suggestions and new program features. [Examples](#)^[213] have been renovated.

6.79 Many functions are improved, detected errors are corrected.

6.80 VideoCAD 6.0 can read projects, created in VideoCAD 4.xx and VideoCAD 5.XX.

6.81 VideoCAD 6.0 has been tested on **Windows Vista**. All incompatibilities found have been eliminated.

6.82 The [regulations of upgrading](#)^[265] previous VideoCAD versions to VideoCAD 6:

- The cost of upgrading amounts the difference between the costs of previous VideoCAD versions (VideoCAD 3.02, VideoCAD 4.0 or VideoCAD 5.0) and VideoCAD 6.0.
- Considerable discounts are offered to the users, whose valuable suggestions have found application in VideoCAD 6.0.
- At upgrading it is necessary to exchange USB dongle.



5. What's new in VideoCAD 5.0

5.1 [Monitor window](#)^[175] has been added. Monitor window logically finishes the information transfer process in video surveillance system "from a real object to an operator" and thus, allows to model the video surveillance system as a hole.

5.2 The new tool in 3D window - [PTZH frame](#)^[172] allows operating a camera in 3D window similarly to PTZ one and additionally to change camera's installation height. Together with the **Monitor window** this tool offers a [new method](#)^[222] of 3D CCTV design.

- 5.3** There is a new opportunity to carry out [Depth-of-field](#)^[171] 3D modeling.
- 5.4** There is a new opportunity to carry out [3D modeling visibility](#)^[171] limited by rain, snow, fog according to the **Meteorological Visibility**.
- 5.5** [Current construction parameters panel](#)^[146] allows creating and editing constructions by input of parameters.
- 5.6** The **Load camera box** is essentially modified and renamed to the [Camera list box](#)^[82]. The following options are added: 3D image show, search, sorting.
- 5.7** [Snap panel](#)^[131] allows fast switching of snaps during drawing.
- 5.8** An option to set [heights in 3D window](#)^[90] separately for each construction, irrespective to a line type.
- 5.9** The new tool - [Inclined rectangle](#)^[94] allows modeling 3D inclined objects.
- 5.10** The new tool - [Filling](#)^[98] allows creating fillings and hatchings.
- 5.11** [Print preview box](#)^[113] is updated. There is a new option to save exact position of the drawing and adjustment for reprinting. The print area displacement caused by **Line type panel** and **Font type panel** is eliminated.
- 5.12** The new [3D models](#)^[128]: a **boy** and a **truck**.
- 5.13** The new tools: [Combine to block](#)^[136] and [Destroy block](#)^[136].
- 5.14** VideoCAD 5.0 can use files of the following CAD formats as a [background](#)^[111]:
- *.dxf AutoDesk DXF Release 12, 13, 14 , 2000, 2002, 2004, 2005, 2006.
 - *.dwg AutoDesk DWG Release 12, 13, 14 , 2000, 2002, 2004, 2005, 2006.
- 5.15** **DWG and DXF reference images**, SHX fonts, DXF Autocad Table, Hatch gradients, Unicode fonts (important especially for languages based on hieroglyphs - Chinese, Korean, Japanese etc.) are supported in CAD [background](#)^[111].
- 5.16** [Visibility of Camera view area](#)^[85] in **3D window** can be switched independently of [View area visibility](#)^[82] in **Graphics window**.
- 5.17** Displaying [cameras' names](#)^[117] and titles can be switched separately..
- 5.18** Option to switch on/off the [display of view area](#)^[82] and view area projections for all selected cameras simultaneously.
- 5.19** Selected camera changes the color together with it's view area.
- 5.20** Construction of person detection area is carried out more precisely, considering additional inflection of bound.
- 5.21** Option to move constructions and cameras in [Select/Edit](#)^[87] mode, without switching to **Move mode**.

5.22 While working only with cameras we have a new option to [lock constructions](#)^[131].

5.23 The tool **Find loaded camera** is updated and renamed to [Show loaded camera](#)^[81].

5.24 Number of redrawings in **3D window** is reduced for increasing program's speed. For forced redrawing, click the image in **3D window**.

5.25 Exact position of the drawing is stored at finishing the work with the program and restored at restart.

5.26 Reloading speed of cameras is increased.

5.27 The range of drawing scaling is expanded.

5.28 The range of focal lengths of lens is expanded.

5.29 Many functions are improved, detected errors are corrected.

5.30 VideoCAD 5.0 can read projects, created in VideoCAD 4.xx.

5.31 The regulations of updating previous VideoCAD versions to VideoCAD 5.0:

- The cost of updating amounts **the difference between the costs of previous VideoCAD versions (VideoCAD 3.02 or VideoCAD 4.0) and VideoCAD 5.0.**

For users, whose valuable suggestions have found application in VideoCAD 5.0, updating is **free of charge**.

4. What's new in VideoCAD 4.0

4.1 There is a possibility of full value [3D designing](#)^[169] of a video surveillance object with loading prepared [3D models](#)^[128] (a man, car and other) and getting images from cameras in the project.

4.2 It has become possible to model the 3D image quality from each camera through the image quality parameters, based on the real videosignal distortions.

4.3 [Line type parameters](#)^[186] include minimum, maximum height and color in the 3D window. The number of line types has increased to 100.

4.4 There are new [system fonts](#)^[188] and [line types](#)^[186]:

- title font in the 3D window;
- sharpness area line;
- focus plane line;
- hyperfocal distance line;
- 3D model line.

4.5 Test object became 3D parallelepiped. Test object can be seen in the 3D window.

4.6 There is the depth-of-field and hyperfocal distance calculation.

4.7 There is a support for all *.dwg file formats as a [background](#)^[111]: *.dwg AutoDesk Release 12, 13, 14 , 2000, 2002, 2004.

- 4.8** It has become possible [to export](#)^[110] obtained drawing to the file of *.dxf format on several layers. It is convenient to process the obtained file in AutoCAD.
- 4.9** It has become possible to change the [scale factor](#)^[192] of nonscalable elements when exporting.
- 4.10** There is a new function of saving drawing - [Save as background](#)^[107].
- 4.11** It has become possible to [print](#)^[113] and export together with the prepared **frames with Title-Blocks**.
- 4.12** The **scaling range and grid step is expanded**. Now maximum grid step is **500 m**, and maximum area displaying on the screen is **15x20 km** (more than 200 square kilometers).
- 4.13** It has become possible to change the [scale factor](#)^[192] when clicking the button **Zoom in**, **Zoom out** and by **turning the mouse wheel**.
- 4.14** There are new means of navigation [Show all](#)^[120], [Find text](#)^[120] and [Zoom window](#)^[75].
- 4.15** Image refreshing is realized [without blinking](#)^[192] due to the using the graphics buffer.
- 4.16** The speed of image repainting with a big number of video cameras is increased.
- 4.17** The [text](#)^[98] scaling accuracy has become higher. Now Title Blocks and other tables can be filled without a risk of strings getting out of the frames.
- 4.18** It has become possible to select one or more constructions [located](#)^[87] one over another.
- 4.19** The **Main window** is renamed to [The camera parameters box](#)^[150]. When launching VideoCAD first Graphics window loads. For showing the camera parameters box the button [Show Camera parameters box](#)^[85] is used.
- 4.20** [Real view area](#)^[83] filling now is not solid, but as hatching. Due to this it doesn't shade other objects.
- 4.21** Graphics [background files](#)^[111] themselves, not the references to their loading, are included in the project file.
- 4.22** All information on program settings (line types, fonts, etc.) is included in the project.
- 4.23** The current project is saved now in the VideoCAD database and at the next program launching the last project, on which you worked, will be available and exactly in the place, on which you broke the work.
- 4.24** There is a **context help** not only for the menu items, but also for the tools on the tool bars. To get the context help for the button click it by the right mouse button and then by the appeared Item **"What's this?"**.
The context help is still available for the menu items and other interface elements. To get the context help for the menu item or the interface element select it and press **F1**.
- 4.25** Now the recommended operating system is **Windows XP**. When working in other operating systems big graphics file displaying errors are possible.

4.26 From the [tool bar](#)^[80] and the [main menu](#)^[105] of the graphics window unnecessary buttons and items are deleted.

4.27 Default parameters of quality levels are changed.

4.28 Examples are remade taking into account new possibilities of the program. The example of the [person identification criteria determination according to the real image](#)^[221] is included.

4.29 Many functions are improved, detected errors are corrected.

4.30 Multilingual version of VideoCAD 4.0 has the possibility of registration with the [dongle](#)^[265].

4.31 VideoCAD MAP is released. VideoCAD MAP is a graphical interface for security systems on the basis of VideoCAD technology. VideoCAD MAP includes all possibilities of VideoCAD and many other additional functions, is partly compatible with VideoCAD by the projects and integrated in the Russian Integrated security system "Intellect".

4.32 The regulations of updating previous VideoCAD versions to VideoCAD 4.0:

- For buyers of **VideoCAD 1.0**, i.e. for **our first buyers**, the updating is **free-of-charge**.
- For the others the cost of updating amounts **the difference between the costs of VideoCAD 3.02 and VideoCAD 4.0**.
- For those, who have bought **more than one VideoCAD licenses at once**, the updating is **chargeable only for one license**. Other licenses can be freely updated.

3. What's new in VideoCAD 3.0

3.1 The opportunity of [loading](#)^[111] the **prepared layouts** as a background in *.bmp, *.jpg, *.emf, *.wmf, *.dwg, *.dxf formats was introduced. To display *.dwg and *.dxf files the **CAD Import** module by **CAD Soft Tools** <http://www.cadsofttools.com> was used.

3.2 The obtained drawing can be [saved](#)^[110] in *.bmp, *.wmf, *.emf formats or [copied](#)^[111] to clipboard in *.bmp, *.emf formats.

3.3 The opportunity of **quality printing**^[113], including the one on several pages to glue them was introduced.

3.4 The opportunity of using [texts](#)^[127] was introduced.

3.5 The opportunity of using various [fonts](#)^[188] and [line types](#)^[186] was introduced.

3.6 New object is a [Mask](#)^[128]. The masks allow to cover any part of a drawing. It is possible to draw new constructions over masks.

3.7 New objects is a [Circle](#)^[126], an [Arc](#)^[97], a [Double line](#)^[94].

3.8 New operations are [Align](#)^[136], [Move loaded camera name](#)^[110].

3.9 The opportunity to [undo](#)^[104] the last four operations was introduced.

3.10 The opportunity of using a constant [coordinate system](#)^[118], that is not dependent on the loaded camera, was introduced.

3.11 The speed of redrawing the drawing containing many constructions and cameras was increased.

3.12 The size of a project file was reduced.

3.13 The maximal quantity of objects on each plan was increased up to 5000 and the maximal quantity of cable segments of each camera was increased up to 500.

3.14 The opportunity of precise scaling using [Ctrl](#)^[148] was introduced.

3.15 The opportunity of quick navigation using the mouse wheel was introduced.

3.16 The opportunity of operating with inches and feet was introduced.

3.17 The opportunity of [changing](#)^[87] the size of a rectangle without distorting its shape was introduced.

3.18 The displaying [view area edges](#)^[82], [view area projection bounds](#)^[83] and [view area actual projections](#)^[83] can be switched on/off separately.

3.19 The opportunity of copying and [pasting](#)^[89] constructions, cables and texts between projects was introduced.

3.20 Many existing functions have been improved, discovered errors have been corrected.

Part



VI

Getting started

6 Getting started

These illustrated teaching articles with step by step instructions will help you to get started with VideoCAD quickly:

These articles describe working with the Professional version.

[The principles of CCTV design in VideoCAD. Part 1. Camera view area \(*.pdf\)](#)

[The principles of CCTV design in VideoCAD. Part 2. Person detection area, person identification area, license plate reading area. Spatial resolution. ""\(*.pdf\)](#)

[The principles of CCTV design in VideoCAD. Part 3. 3D modeling in VideoCAD"\(*.pdf\)](#)

[The principles of CCTV design in VideoCAD. Part 4. Illumination and camera sensitivity in CCTV"\(*.pdf\)](#)

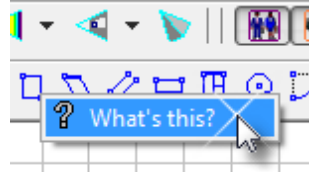
[The principles of CCTV design in VideoCAD. Part 5. Video surveillance of moving objects. "\(*.pdf\)](#)

See also: [Examples of work with VideoCAD](#)^[213]

VideoCAD employs a **context-sensitive help system**. This means that the program tries to direct you to the portion of the help system that is most likely to answer your question, based on what you are viewing or doing.

To get detailed information about any component, box or menu item, move the input focus (mouse cursor) to the component and press **F1**.

To get detailed information about any button on the Tool bar, right click on it then choose **What's**



this? pop-up item.

Part



VII

Interface

7 Interface

The VideoCAD Lite interface consists of the [Graphics window](#)^[74] and the additional windows and boxes:

- [Camera Geometry](#)^[150]
- [Spatial resolution](#)^[158]
- [3D window](#)^[169]
- [Monitor window](#)^[175]
- [Options box](#)^[185]
- [Camera list](#)^[200]
- [Serial numeration of cameras](#)^[202]
- [Layouts](#)^[204]
- [Signal cable length calculation box](#)^[205]
- [Power cable electrical parameters and length calculation box](#)^[206]
- [Length calculation of line segments](#)^[208]

You can open any window or box from the Graphics window.

VideoCAD employs a **context-sensitive help system**. This means that the program tries to direct you to the portion of the help system that is most likely to answer your question, based on what you are viewing or doing.

To get detailed information about any component or menu item, move the input focus (mouse cursor) to the component and press **F1**.

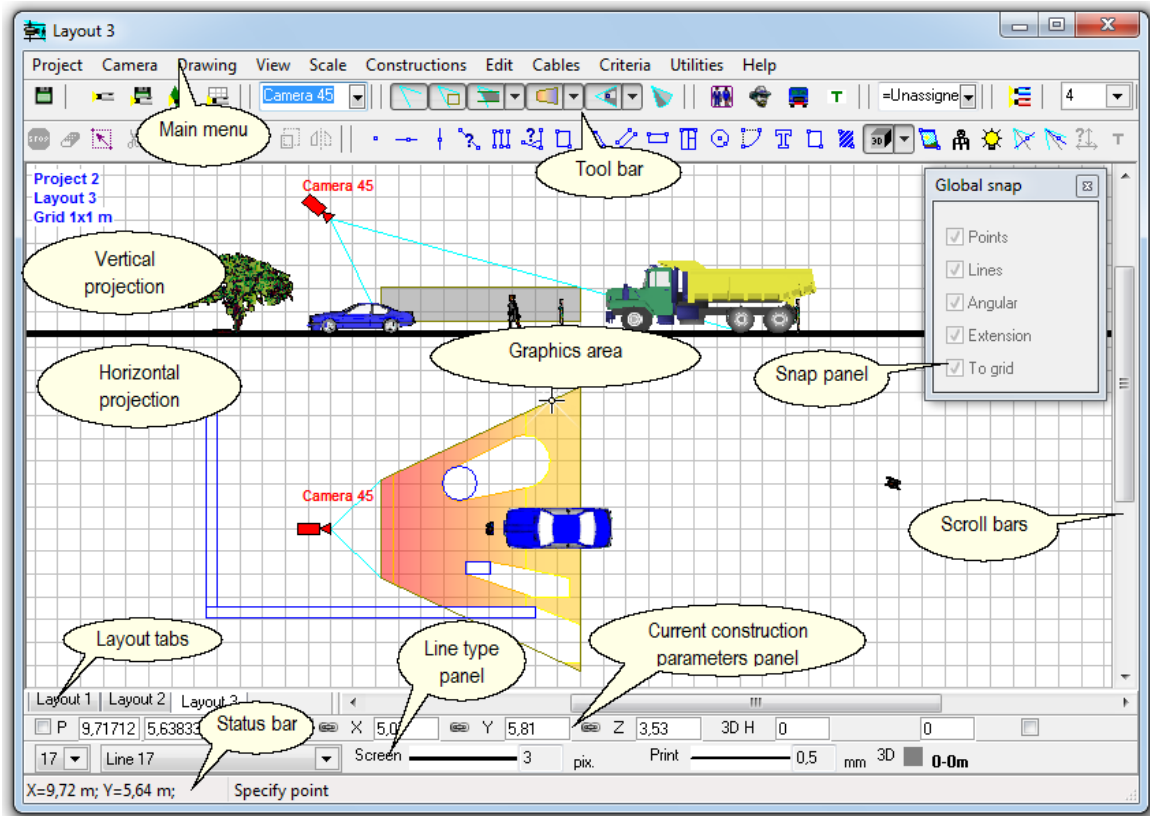
To get detailed information about any button on the Tool bar, right click on it then choose **What's this?** pop-up item.

Mouse:

Any **Wheel Mouse** is particularly convenient when changing parameters and moving along layouts in the **graphics window**.

In all the windows except for the Graphics window the use of mouse is almost the same as when using it with other Windows programs. The use of mouse in the **graphics window** is reviewed in the correspondent [HELP section](#)^[75].

7.1 Graphics window



It is the main window of the program.

The window is designed for the visual cameras' view area representation and analysis, visual choice of lens parameters and camera locations, calculation of cable parameters and a drawing preparation to be pasted into graphical path of the project as well.

During [3D modeling](#)^[169], all work of placing and editing 3D models is carried out in the Graphics window too.

The graphics window contains:

- [Graphics area](#)^[75]
- [Main menu](#)^[105]
- [Tool bar](#)^[80]
- [Status bar](#)^[142]
- [Line type panel](#)^[144]
- [Font type panel](#)^[145]
- [Current construction parameters panel](#)^[146]
- [Layout tabs](#)^[141]
- Horizontal and vertical scroll bars
- [Snap panel](#)^[131]
- [Keyboard shortcuts](#)^[148]

7.1.1 Graphics area

See [Graphics area location](#)^[74].

The **graphics area** contains two projections of the current [layout](#)^[204].

A thick black line designating the **ground** in vertical (upper) projection parts these two projections.

You can **hide** any projection using the tools [Hide horizontal projection](#)^[86]  and [Hide vertical projection](#)^[86]  or using the corresponding items of the [Main menu](#)^[105].

Main work is carried out as a rule in the horizontal projection. Vertical projection is used only in some cases.

[Navigation](#)^[75]

[Coordinate systems](#)^[76]

[Types of objects](#)^[76]

[Possible states of objects](#)^[76]

[Normal state](#)^[76]

[Selected state](#)^[77]

[Editing state \(active state of cameras \)](#)^[77]

[Hidden state](#)^[79]

Navigation

Wheel Mouse is particularly convenient when working in the **graphics window**. Using the **Wheel mouse** you can change drawing scale with the simultaneous zooming in the drawing sections pointed by the cursor. 

If **Ctrl is not pressed** at **changing the scale**, then the scale changes roughly which is convenient at navigation.

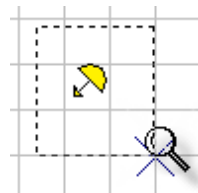
If **Ctrl is pressed**, the scale changes with the less step which is convenient for the precise drawing positioning before [printing](#)^[113] or [saving](#)^[110].

You can **move the drawing** by pressing and holding down the **mouse wheel** (or the middle button). If **Ctrl** is not pressed, the entire drawing is dragged, if **Ctrl** is pressed, the horizontal projection is dragged only.

You can move drawing using horizontal and vertical scroll bars.

When [Alt is pressed](#)^[148], it is possible to move drawing in the Graphics window using arrow keys and change scale using plus and minus keys irrespective of the input focus.

To increase any screen area press in the corner of the area and hold the right mouse button then move the mouse with the right button pressed. At the same time you will see zoom window. After releasing the button, the area inside the zoom window will be shown on the full screen.



There is an opportunity of quick navigation with the help of [text markers](#)^[120].

Since all the constructions in VideoCAD are made by **two clicks**, but not by pressing and release the mouse button (as in most CAD programs), so it is very convenient to combine constructions with quick navigation.

If possessing certain skills in **Wheel mouse** use dragging the entire drawing is not required practically.

To show all cameras and constructions, use item of the **Main menu** or **Pop-up menu**: Scale> [Show all](#)^[120].

Coordinate systems

The **graphics area** allows to use 2 [coordinate systems](#)^[118]:

- **Fixed coordinate system**
- **Float coordinate system attached to the [Active camera](#)**^[78]

In case of **Fixed coordinate system**, the **origin of coordinates** does not vary when changing the active camera. The origin of coordinates is displayed by **two icons**  in horizontal and vertical projections. You can change a point of origin after choosing the menu item **View > [Set origin](#)**^[119].

In case of the **coordinate system attached to the active camera**, the origin always coincides with the active camera location. It is convenient when studying its view area.

A [grid](#)^[86] is fixed to the **origin of coordinates**, and the counting of the **cursor current coordinates** in the [status bar](#)^[142] starts from the origin.

Types of objects

The **graphics area** may contain the following **objects**:

- **Cameras**
- [Constructions](#)^[90]
- [3D objects](#)^[128]
- [Backgrounds](#)^[111]
- [Cables](#)^[137]
- [Texts](#)^[98]
- [Titles](#)^[117]

Possible states of objects

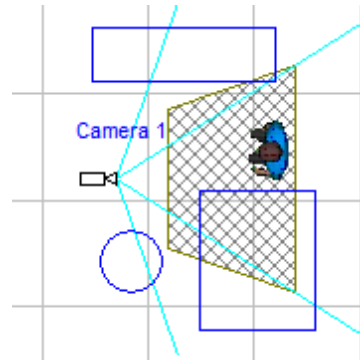
All the **objects** except for the **backgrounds** and **titles** can take one of the following states:

- [Normal](#)^[76];
- [Selected](#)^[77];
- [Editing](#)^[77] (active state of camera);
- [Hidden](#)^[79];

You can change object's state with the help of the [Select/Edit](#)^[87]  tool.
To hide objects use the [Hide](#)^[135] Main menu item.

Normal state

An object is displayed in its usual color. Editing and moving is not possible.



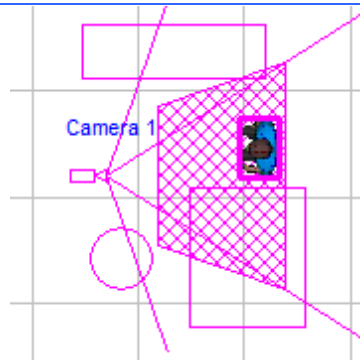
Selected state

An object is displayed in **pink color**. It is possible to **delete, drag, move, rotate, change draw order, scale, mirror and copy** the **object**.

Several objects can be selected at a time.

You can select objects by clicking or by capturing by the **selection window** in the [Select/Edit](#)  mode.

See [Select/Edit](#)  for details.



Editing state (active state of cameras)

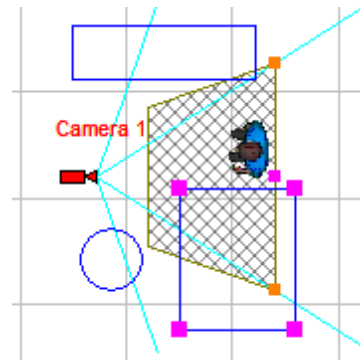
Object's **base points** are marked with **pink grips**, **camera name and icon** are marked with **red color**, **texts** are displayed in **pop-up frame**.

The editing state can be taken only by one of the objects and one camera at a time. One of the cameras is always Active.

Switching an object to the editing state is performed by **double clicking** the object in the [Select/Edit](#)  mode.

To switch [circle](#)  into the **editing state** you need to double-click on **its center** or on the **point on its radius** that appears during the process of construction.

To switch [arc](#)  into the editing state you need to double-click on **its center** or on **either of its two ends**.



How to edit objects

You can change the shape and geometrical sizes of the objects and **edit the texts**. The [line types](#)  of the objects and the [fonts](#)  of the **texts** can be changed, too.

To edit an object click beside a **base point** with a grip and move the cursor. After clicking for the second time, the changed object will be saved.

When editing a [rectangle](#)  or a [mask](#) , then several points will move at a time, the **rectangle** or the **mask** remaining square.

If **Ctrl** is pressed when editing a **rectangle** or a **mask**, then **one point** will move only.

When editing the [Double line](#)^[94] or [Wall](#)^[95], the **whole Double line or Wall** will be moved. If **Ctrl** is pressed when editing the **double line or wall**, **only one line** will be moved.

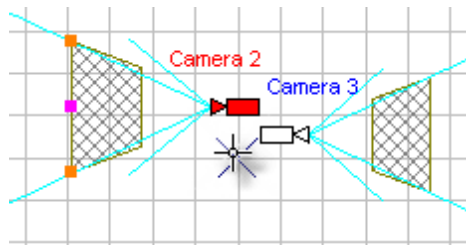
When clicking the [text](#)^[98] twice the **pop-up frame** appears allowing to edit **text** in it. When clicking the right mouse button the **pop-up menu** of text editing appears in the frame. It is possible to change object's parameters in editing state on the [current construction parameters panel](#)^[146] which automatically appears in the bottom of graphics window. *You can edit the object by changing parameters on the panel.*

Active camera

Pay attention that the icon of one of cameras is **highlighted in red**, and icons of other cameras are colorless. One of cameras is always **active**.

The **active camera** parameters are displayed in the [Camera Geometry box](#)^[150], [Spatial resolution](#)^[158].

The **active camera** itself is displayed on the foreground in the **Graphics window**.

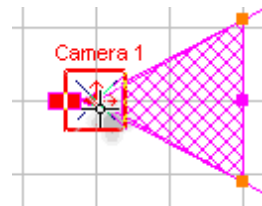


In the [3D window](#)^[169] there is an image from the active camera.

To switch camera to **active state** double-click on the center of its lens.

You can fast activate any camera in the project using the [Active camera](#)^[82] combo box on the **Tool bar**. To activate a camera, just choose its name in the list.

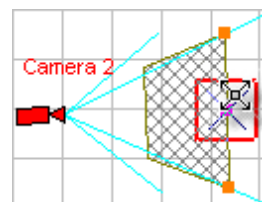
To find the active camera on the layout, right click on the combo box then choose **Find camera** item.



The active camera **parameters** can be changed both using the **boxes** and graphically with the tools of the [Active camera group](#)^[103]. With the help of the [View](#)^[82] button group you can change the appearance of **view area projections** of the **active camera**.

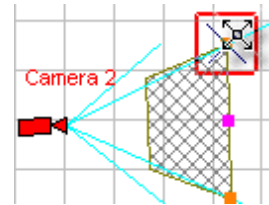
For tilting and panning the active camera on the layout in [Select/edit](#)^[87] mode:

- Move the cursor to the pink grip in the middle of the view area bound. Thereupon, the point will be outlined by red square;
- Click on it by mouse;
- Move the cursor;
- To stop tilting or panning click once again on a point where the middle of the view area bound is to be located.



To change [lens focal length](#)^[153] of the active camera on the layout in [Select/edit](#)^[87] mode:

- Move the cursor to any orange grip on the ends of view area bound. Thereupon, the point will be outlined by red square;
- Click on it by mouse;
- Move the cursor;
- To stop changing focal length click once again on a point where the end of view area bound is to be located.



Hidden state

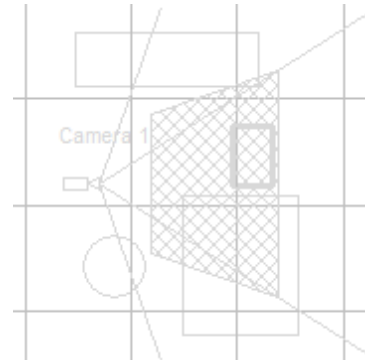
An object is displayed on the background in **light grey** color. **3D objects** are displayed as grey frames. The rest characteristics are similar to those of **normal state**.

The **hidden state** is used to conceal the temporarily interfering objects.

The snap [Extension](#)^[131] is disabled for **hidden objects**.

Several objects can be hidden at a time.

To hide an object use [Select/Edit](#)^[87] and [Hide](#)^[135] tools.



7.1.2 Tool bar



See [Tool bar location](#)^[74]

Visibility of buttons on the Tool bar can be adjusted on the [Toolbar](#)^[197] tab of the **Options box**.

- **"Project" button group**^[81]
 - [Save project](#)^[81]
- **"Camera" button group**^[81]
 - [New](#)^[81]
 - [Save to project](#)^[82]
 - [Camera list](#)^[82]
 - Combo box [Active camera](#)^[82]
- **"View" button group**^[82]
 - [View area edges](#)^[82]
 - [View area projection bounds](#)^[83]
 - [Fill projections](#)^[83]
 - [Spatial resolution](#)^[84]
 - [3D view area](#)^[85]
 - Combo box [Lens focal length](#)^[85]
 - [Camera Geometry](#)^[85]
 - [Spatial resolution](#)^[85]
 - [3D window](#)^[86]
 - [Monitor window](#)^[86]
 - [Hide vertical projection](#)^[86]
 - [Hide horizontal projection](#)^[86]
- **"Grid" control element group**^[86]
 - [Grid selected step box](#)^[86]
 - [ON/OFF mode of automatic grid step selection](#)^[86]
 - [ON/OFF grid displaying](#)^[87]
- **"Edit" button group**^[87]
 - [Stop operation](#)^[87]
 - [Erase](#)^[87]
 - [Select/Edit](#)^[87]
 - [Cut](#)^[89]
 - [Copy](#)^[89]
 - [Paste](#)^[89]
 - [Move](#)^[89]
 - [Rotate](#)^[90]
 - [Scale](#)^[90]
 - [Mirror](#)^[90]
- **"Construction" button group**^[90]
 - [Point](#)^[91]
 - [Horizontal line](#)^[91]
 - [Vertical line](#)^[92]
 - [Line segment](#)^[92]
 - [Polyline](#)^[92]
 - [Angle](#)^[93]
 - [Rectangle](#)^[93]
 - [Inclined rectangle](#)^[94]
 - [Double line](#)^[94]
 - [Wall](#)^[95]
 - [Aperture in Wall](#)^[96]
 - [Circle](#)^[97]
 - [Arc](#)^[97]
- [Text](#)^[98]
- [Mask](#)^[98]
- [Filling](#)^[98]
- [3D model](#)^[98]
- [3D image](#)^[100]
- [Rotakin](#)^[101]
- [Signal cable](#)^[101]
- [Power cable](#)^[102]
- [Global snaps](#)^[102]
- **"Active camera" control element group**^[103]
 - [Change installation height](#)^[103]
 - [Change view area upper bound](#)^[103]
 - [Change view area lower bound](#)^[103]
- **"Scale" button group**^[103]
 - [Move drawing](#)^[103]
 - [Zoom in/zoom out](#)^[104]
- **"Undo" button group**^[104]
 - [Undo](#)^[104]
 - [Redo](#)^[104]

7.1.2.1 Tools



See [Tool bar location](#)^[74]

Visibility of buttons on the Tool bar can be adjusted on the [Toolbar](#)^[197] tab of the **Options box**.

'Project' button group

Save to project

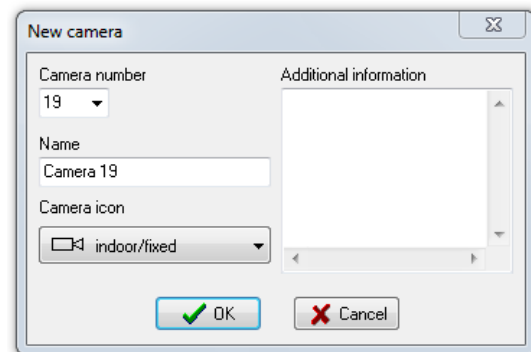
Save working project to a file.

"Camera" button group

New

Create **new camera** with default parameters.

In the dialog box appeared you can change **camera number**, **name**, type of the camera which determines the kind of icon by which it will be displayed. If necessary, you can enter **additional information** on the created camera (for example: purpose, a place and features of installation).



Later it is possible to change name, number, type of the camera and the additional information in the [Camera list](#)^[200] box.

Cameras can be numerated sequentially with the help of the [Numerate cameras](#)^[109] tool.

Cameras are displayed by different icons only if the Display camera type box in the [Options box](#)^[185] is marked.

On the [Line type panel](#)^[144] it is possible to choose [line type](#)^[186] by which the icon of the camera and [View area projection bounds](#)^[83] will be drawn. When displaying [spatial resolution](#)^[84] is disabled, projection will be [filled](#)^[83] (hatched) by the color of assigned line type. Later it is possible to change line type using [Change line type](#)^[136] tool.

After entering all necessary data click **OK**, to cancel the operation click **Cancel**.

If there is already a camera with chosen number in the current project, VideoCAD will ask to specify, whether you would like to rewrite it.

After camera creation specify by clicking a place for the new camera on the layout.

Just after camera creation the moving mode will be switched on. When placing will be completed, click  [Select/Edit](#)^[87] button or press **ESC**.

It is convenient to create new cameras with already set parameters by [copying](#)^[89] and [pasting](#)^[89]

existing ones.

Save to project

All the **specified** and **calculated parameters** of the [Active camera](#)^[78] and layout are saved to the current project.

Saving is performed automatically at many operations.

Camera list

Clicking this button opens **Camera list box**, in which camera list of current project is displayed. [Active camera](#)^[78] is highlighted by **red frame**. Any camera can be activated, removed, renamed, found on layouts, it is possible to show 3D image from any camera. It is also possible to sort cameras in the list. For carrying out any manipulations with the camera first select its name in the list by single clicking.

See more: [Camera list](#)^[200]

Active camera combo box

Using the combo box, you can fast activate any camera in the project. To activate a camera, just choose its name in the list.

To find the active camera on the layout, right click on the combo box then choose **Find camera** item.

"View" button group

View area edges

Show the [Active camera](#)^[78] view area edges, calculated according to [parameters](#)^[152] in the **Camera Geometry box**.

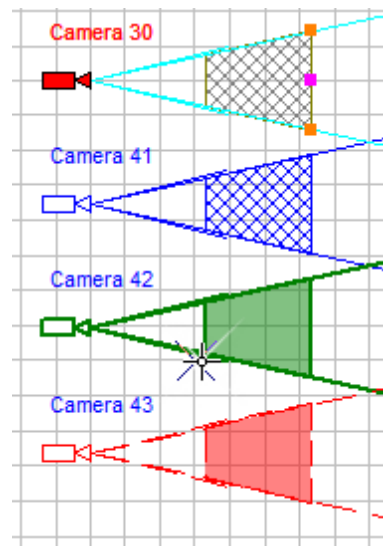
Line type can be changed in the [options box](#)^[186].

If the [line type of camera](#)^[81] coincides with default line type for camera icons, specified in the Options box, then for this camera the line type of View area edges is taken from the Options box>Lines>System line types>[Bounds](#)^[186]. This line type is assigned to new cameras by default (Camera 30 on the figure).

If another line type was assigned to the camera, the View area edges of this camera is drawn by this line type assigned to the camera, as well as the [View area projection bounds](#)^[83] and camera icon. (Camera 41,42,43).

Thus you can draw different cameras and their view areas by different colors, thickness and line style.

A button state at the moment of camera saving determines whether the **view area edges** of the



given camera will be displayed when this camera is inactive.

If selected cameras exist on the current layout, except the active camera, this button changes view  and operates the visibility of **View area edges** of all selected cameras simultaneously.

View area projection bounds

Show the bounds of the [Active camera](#)^[78] view area projections calculated according to [parameters](#)^[152] in the Camera Geometry box.

Line type can be changed in the [options box](#)^[186].

If the [line type of camera](#)^[81] coincides with default line type for camera icons, specified in the Options box, then for this camera the line type of **View area projection bounds** is taken from the Options box>Lines>System line types>[Bounds](#)^[186]. This line type is assigned to new cameras by default.

If another line type was assigned to the camera, the **View area projection bounds** of this camera is drawn by this line type assigned to the camera, as well as the [View area edges](#)^[83] and camera icon.

A button state at the moment of camera saving determines whether the bounds of the given camera view area projections will be displayed when this camera is inactive.

If selected cameras exist on the current layout, except the active camera, this button changes view  and operates the visibility of **View area projection bounds** of all selected cameras simultaneously.

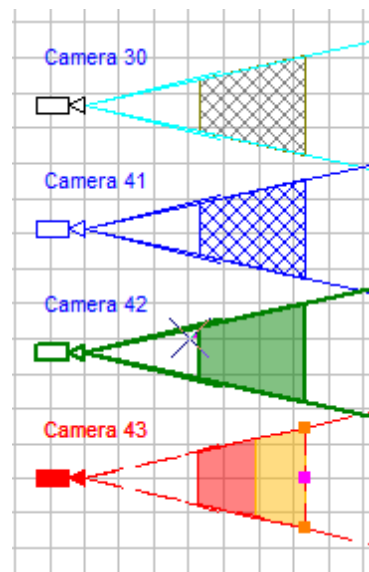
Fill projections

Hatch or fill by blend color view area projections of [active camera](#)^[78] (if these projections exist) calculated according to parameters in the [Camera Geometry](#)^[152] box.

If the [line type of camera](#)^[81] coincides with default line type for camera icons, specified in the Options box, then hatching (filling) projections of this camera is performed by grey color by default (Camera 30 on the figure).

If another line type was assigned to the camera, then hatching (filling) projections of this camera is performed by a color of this line type assigned to the camera. (Camera 41,42).

If the [Spatial resolution](#)^[84] is enabled, then colors of hatching (filling) projections is determined by Spatial resolution parameters (Camera 43).



Drop-down menu:

-  **Hatching** - hatch projections.
-  **Filling** - fill projections by blend semitransparent color.

If the **Hatching** item is chosen, but in the drop-down menu of the [Spatial resolution](#)^[84] button the **Gradient** item is chosen, then the projections will be hatched by a bold style of hatch without gradient.

- **Off** - don't hatch and fill view area projections.

A button state at the moment of camera saving determines whether the filling or hatching of the view area projections of the camera will be displayed when this camera is inactive.

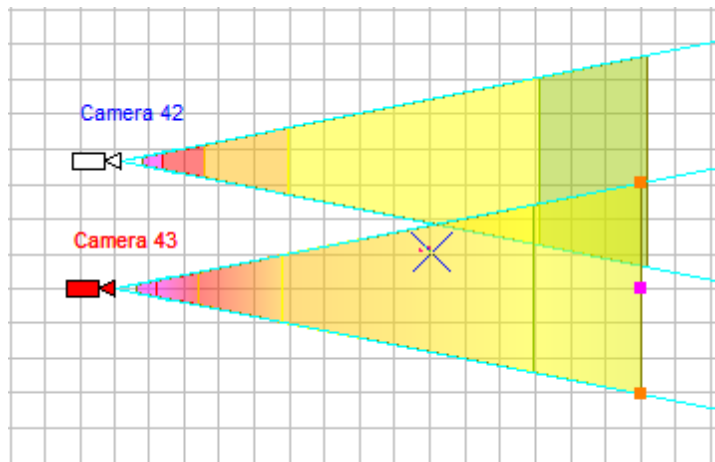
If selected cameras exist on the layout, except the active camera, this button changes view  and operates the visibility of filling (hatching) projections of all selected cameras simultaneously.

Spatial resolution

Fill in different colors **regions** on the **view area projections of the active camera**, depending on the **spatial resolution** within these regions.

Colors of the regions and the boundary values of the spatial resolution are determined by the **spatial resolution pattern** assigned to the camera.

In the [Spatial resolution box](#)^[158] you can edit the patterns and assign them to cameras.



Drop-down menu:

-  **Discrete colors** - fill the regions in discrete colors in accordance with a spatial resolution at the far bounds of the regions.
-  **Gradient** - fill the view area projection in gradient color according to the spatial resolution at each point on the projection.

In case of gradient color is chosen, the colors at the **far region bounds** equal to the colors of the **spatial resolution pattern**, but between the bounds color changes smoothly, as well as real spatial resolution.

Gradient reflects the spatial resolution more accurately and looks impressive, but discrete colors are more intuitive and easy to use..

If the **Gradient** item is chosen, but in the drop-down menu of the [Fill projections](#)^[83] button the **Hatching** item is chosen, then the projections will be hatched by a bold style of hatch without gradient.

- **Off** - don't display spatial resolution.

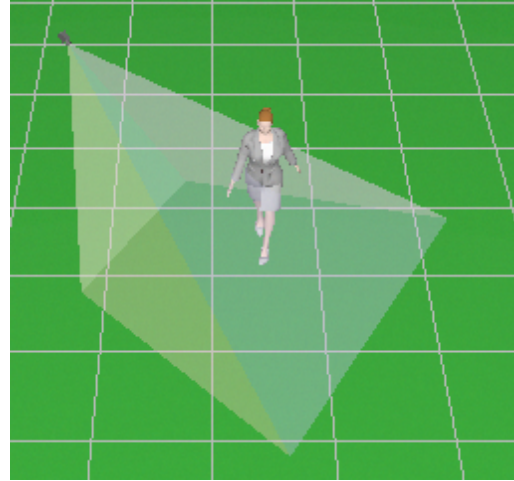
A button state at the moment of camera saving determines whether the spatial resolution of the camera will be displayed when this camera is inactive.

If selected cameras exist on the layout, except the [Active camera](#)^[78], this button changes view  and operates the visibility of spatial resolution of all selected cameras simultaneously.

See also: [Spatial resolution box](#)^[158], [Visualization of the camera control area projections and spatial resolution within them](#)^[240]

3D view area

Display 3D translucent view area of the [Active camera](#)^[78] in the [3D window](#)^[169]. Through other cameras it is possible to see view area of this camera from the side.



A button state at the moment of camera saving determines whether the 3D view area of the given camera will be displayed when this camera is inactive.

If selected cameras exist on the current layout, except the [Active camera](#)^[78], this button changes view  and operates the visibility of **3D view areas** of all selected cameras simultaneously.

Displaying 3D view areas is disabled by default. It can be enabled on the **View** tab in the **Image parameter panel**.

Lens focal length combo box

The box duplicates a corresponding [box](#)^[153] in the **Camera Geometry** box to enhance the convenience when using the **graphics window**.

When moving the cursor to the box with a lens focal length the information on the **lens view angles** appears.

You can change lens focal length **of all selected cameras simultaneously**. For this purpose:

- [Select](#)^[87] necessary cameras on the layout
- Right click on this combo box, then click on the **Assign to selected cameras** pop up item.

See more: [Lens focal length](#)^[153]

Camera geometry

Clicking this button will open [Camera Geometry box](#)^[150]. This box includes geometric parameters of the camera, lens and installation parameters of the camera.

See more: [Camera geometry box](#)^[150]

Spatial resolution

Show or hide the [Spatial resolution box](#)^[158]. In this box it is possible to create and edit patterns of spatial resolution and field of view size visualization. In the box there are prepared spatial resolution patterns according to the following criteria: Home Office Scientific Development Branch, Home Office Guidelines for identification, P 78.36.008-99. Also in the box there are examples of images of group of people are automatically displayed for each region of spatial resolution.

See more: [Spatial resolution box](#)^[158], [Spatial resolution button](#)^[84].

3D window

Show or hide the **3D window**. The **3D window** displays the image from the [Active camera](#)^[78]. During the image generation in the 3D window on the **3D window button** **red frame flashes** ^[24].

See more: [3D window](#)^[169].

Monitor window

Show or hide **Monitor window**. In the Monitor window images from any quantity of cameras are displayed simultaneously. Monitor window allows modeling monitors of video surveillance system.

See more: [Monitor window](#)^[175].

Hide vertical projection

If this button is pressed, the **horizontal projection** is only present in the **graphics area**. To display a **vertical projection** click this button again.

Hide horizontal projection

If this button is pressed, the **vertical projection** is only present in the **graphics area**. To display a **horizontal projection** click this button again.

"Grid" control element group

The [graphics area](#)^[75] includes **2 grids** with the coinciding horizontal coordinates: a **grid in the vertical projection** and a **grid in the horizontal projection**. The grid origin coincides with the chosen [origin of coordinates](#)^[118].

Grid selected step box

To change a grid step click the box and choose the required step from the pop-up list. If the **automatic step selection** mode is active when changing the step value in the box this mode is deactivated.

See also: ["Grid" control element group](#)^[86]

ON/OFF the automatic grid step selection mode

Switch on/off the mode of **automatic grid step selection** according to a drawing scale.

See also: ["Grid" control element group](#)^[86]

ON/OFF displaying grid

Switch on/off displaying grid.

Choosing **NO** in the **grid step selection box** can also deactivate grid displaying.

See also: ["Grid" control element group](#)^[86]

"Edit" button group

Buttons of this group are used for the editing [constructions](#)^[90], [3D objects](#)^[128], [cables](#)^[101], [texts](#)^[98] and **cameras**. In this case the [status bar](#)^[142] in the bottom of the Graphics window displays hints.

When editing an object the **projections** should be taken into account. Different projections are different views, though connected ones. Moving objects correctly between projections has no sense and is impossible to perform.

To start the editing [select](#)^[87] the desired **objects**.

Choosing the items from the pop-up menu that appears when clicking the [graphics area](#)^[75] by the right mouse button performs the commands of this group as well.



Stop operation

Stop the current operation. Use also **Esc**.



Erase

Erase the [selected objects](#)^[77]. To select objects use the button [Select/Edit](#)^[87].

If there are no **selected objects** this button is disabled.

Use also **Del**.

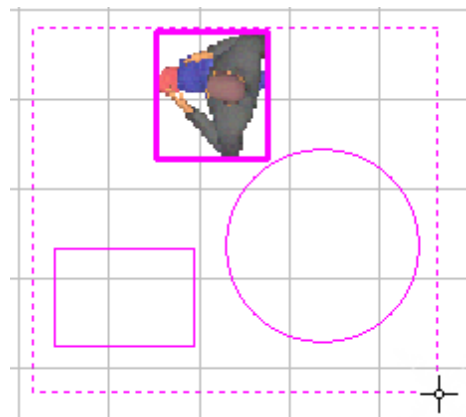
You can not erase the [Active camera](#)^[78].



Select/Edit

With this button chosen the first corner of **selection window** appears when clicking any empty place of [graphics area](#)^[75] once. Clicking it again completes the designation of **selection window**.

All the **objects**, which hit in the **selection window** and reside on the **projection** coinciding with one being clicked for the first time, will be [selected](#)^[77]. However, the earlier **selected objects** not hitting in the **selection window** will revert to [normal state](#)^[76].



If **Ctrl** is pressed at clicking, the **objects** within the **selection window** are inverted, on the contrary, state of those not hitting in the **selection window** remains the same.

It is possible to **select objects by one** by clicking their image once, thus enabling the earlier selected **objects** to revert to normal state.

If **Ctrl** is pressed at clicking, the **objects** are inverted, and the state of the rest remains the

same.

During construction [3D scenes](#)^[169] it is often necessary to place some constructions one over another at a different height, made by means of different [line types](#)^[186].

To select one or more construction, located one over another, made by means of different line types:

- make the [line type panel](#)^[144] visible, for example by double clicking any construction;
 - choose on the panel the line type of construction you want to select;
- select the construction by clicking.

Just repeat clicking at the same place without moving the cursor. Thus objects under the cursor will be selected sequentially.

To move objects on the foreground or background use menu items: [Bring to front](#)^[135], [Send to back](#)^[135].

Selected objects can be moved. To move the selected objects, bring the cursor to the selected one, press the left mouse button and move the selected objects. After finishing the moving, release left mouse button.

To cancel selection click this button again.

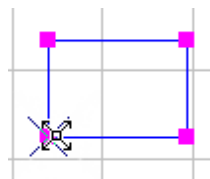
To **select all objects** on the current layout use **Ctrl+A** shortcut.

For switching to Select / Edit mode from any mode use also **Esc** button.

See also: [Selected state](#)^[77]

Editing state of objects

To translate an object into [editing state](#)^[77] double-click its image. After that **pink grips** appear on the object base points. When moving the cursor over this point its image changes.



To edit an object click beside a base point with a grip and move the cursor. After clicking for the second time, the changed object is set up.

To switch the [circle](#)^[126] into the editing state you need to double-click on its center or on the point on its radius that appears during the process of construction.

To switch the [arc](#)^[127] into the editing state you need to double-click on its center or on either of its two ends.

When editing a [rectangle](#)^[93] or a [mask](#)^[98], then several points will move at a time, the rectangle or the mask remaining square.

If **Ctrl** is pressed when editing a rectangle or a mask, then one point will move only.

When editing a [Double line](#)^[94] or [Wall](#)^[95], the whole Double line or Wall will be moved.

If **Ctrl** is pressed when editing the double line or wall, only one line will be moved.

When clicking the [text](#)^[98] twice the pop-up frame appears allowing to edit text in it. When clicking the right mouse button the pop-up menu of text editing appears in the frame.

It is possible to change object's parameters in editing state on the [current construction parameters panel](#)^[146] which automatically appears in the bottom of graphics window.

See also: [Editing state](#)^[77]

Activate cameras

When double-clicking the camera lens the following actions are performed:

- the [Active camera](#)^[78] is saved.
- the camera being double-clicked will become active.

It is convenient to pan and tilt the active camera by moving the grip in the middle of the view area upper bound.

In a similar way by moving grips on the ends of the view area upper bound it is possible to change [lens focal length](#)^[153] of the camera.

See also: [Active camera](#)^[78]

See also: ["Edit" button group](#)^[87]

Cut

Cut the [selected objects](#)^[77] into the VideoCAD internal clipboard.

It is possible to cut **objects** of different projections at a time, and to cut any quantity of [constructions](#)^[90], [3D objects](#)^[128], **cameras**

Copy

Copy the [selected objects](#)^[77] into the VideoCAD internal clipboard.

It is possible to copy **objects** of different projections at a time, and to copy any quantity of [constructions](#)^[90], [3D objects](#)^[128], [texts](#)^[98] and **cables**.

See also: [Copy with base point](#)^[134]

Paste

Paste the **objects** from the VideoCAD internal clipboard.

After clicking this button specify the **base point** of paste in the projection being clicked when **cutting** or **copying**.

It is possible to paste into different [layouts](#)^[204], paste **cables** of one camera while another camera is active (in this case the pasted cables belong to a camera which is active during paste), and to paste any quantity of [constructions](#)^[90], [3D objects](#)^[128], **cameras**, [texts](#)^[98] and **cables** at a time.

It is available to **copy** and **paste constructions, cables and texts between the projects**. To this effect make a copy in one project, then open another project or create a new one and paste what you have copied.

Be careful when copying and pasting **cables**. You can copy only **cables of Active camera**^[78], and when pasting, these cables will belong to the **camera which is active during pasting**.

*If a camera is being pasted a **new camera** with parameters of the pasted camera is created automatically. **This is an alternative way to create new cameras.***

Move

Move the [selected objects](#)^[77].

After clicking this button the first click in a [graphics area](#)^[75] designates the starting moving point,

the second click - the final one.

*When moving take into account the **projection** to which the objects are attached. A simultaneous moving objects in different projections vertically is locked as being incorrect.*

[Selected](#)^[77] objects or cameras can be moved in [Select / edit](#)^[87] mode. In order to move place the cursor above the selected object, press left mouse button, move, after moving is finished release the left mouse button.

Rotate

Rotate the [selected objects](#)^[77].

After clicking this button the first click in a [graphics area](#)^[75] designates the rotation **center**, the second click specifies the initial rotating point, and the third click specifies the final rotating point.

*When rotating take into account the **projection** to which the objects are attached. The selected objects, attached to the projection with a rotation center designated, can rotate only.*

*The [scalable](#)^[188] fonts can rotate only. If a font is not scalable then its **initial point** rotates only, **the text remaining horizontal**.*

The [Active camera](#)^[78] can be rotated in [Select / edit](#)^[87] mode by moving the grip in the middle of the view area upper bound.

Scale

Change scale of [selected](#)^[77] constructions relative to the center of scaling.

After clicking on this button, the first click on the [graphics area](#)^[75] specifies the **center of scaling**.

Then moving the cursor up increases sizes of selected constructions, moving the cursor down decreases sizes of selected constructions.

In the [Status bar](#)^[142] the current scale factor is displayed.

When required sizes will be achieved, click for the second time to complete scaling operation. To cancel the scaling press **ESC**.

This tool does not scale [3D models](#)^[98]. 3D models can be scaled in [editing state](#)^[77] with the help of the [Current construction parameter panel](#)^[147].

Mirror

Mirror the [selected](#)^[77] constructions relative to the horizontal or vertical line passing through the specified point.

After clicking on this button, the first click on the [graphics area](#)^[75] specifies the point through which a mirror line must be passed.

Then moving the cursor changes position of the mirror line.

When required position of the mirroring objects will be achieved, click for the second time to complete mirroring operation. To cancel mirroring press **ESC**.

"Constructions" button group

Buttons of this group are used to perform **measurements** and **constructions**. The [status bar](#)^[142]

in the bottom of the Graphics window and the [Current construction parameter panel](#) ^[146] display the **results** of measurements. The **constructions** can be used for 3D modeling the video surveillance object, for specifying the **required view areas, objects, obstacles, etc.**

Each **construction** is attached to the projection containing its **initial point**. The constructions can be **moved, deleted, rotated, edited, copied, mirrored, scaled, changed draw order, hidden** using the buttons of [Edit](#) ^[87] group.

Constructions made in the horizontal projection are also displayed in the [3D window](#) ^[169]. At this, the line corresponds to a vertical rectangle, the point - to a vertical segment, the rectangle - to a parallelepiped, circle - to a cylinder, etc.

Constructions are stretched throughout the height and become 3D objects.

Minimal and maximal height of each object is determined by parameters of [line type](#) ^[186], by which the construction is made. The heights can be set separately for each object, during constructing and editing by means of [current construction parameters panel](#) ^[146].

Color of constructions is determined only by [line type](#) ^[186], which is used at constructing.

To enhance speed and convenience of drawing, VideoCAD uses global and local [snaps](#) ^[131].

The **construction coordinates** are displayed relatively to the chosen [origin of coordinates](#) ^[118]. The coordinates of constructions **belonging to one camera only** ([focal plane](#) ^[81], [optical axis](#) ^[81], [field-of-view size](#) ^[81], [test object](#) ^[81], [change view area upper bound](#) ^[103]) are always displayed **relatively to the Active camera** ^[78].

When choosing a button of this group a [line type panel](#) ^[144] or a [font type panel](#) ^[145] appear, allowing to change the [line](#) ^[186] or [font](#) ^[188] types.

When double-clicking the panels the [options box](#) ^[185] appears.

Above these panels the [current construction parameters panel](#) ^[146] appears, by means of which it is possible to create construction, by setting its parameters.

• Point

When this button is pressed, clicking on the graphics area places a point.

The [status bar](#) ^[142] displays the coordinates of this **point** relatively to the [origin of coordinates](#) ^[118].

In the [3D window](#) ^[169] the vertical segment will be displayed in the points place.

Default minimal and maximal heights of the segment are determined by the [line type](#) ^[186], which constructs the point. The heights can be set separately for each point by means of the [current construction parameters panel](#) ^[146], on which it is also possible to set coordinates of the point in numeric values.

See also: ["Constructions" button group](#) ^[90]

→ Horizontal line

When this button is pressed, clicking on the [graphics area](#) ^[75] specifies a point through which a **horizontal line** is passes.

The [status bar](#) ^[142] displays the line **height** or its **shift** from the [origin of coordinates](#) ^[118] according to the projection being clicked.

In the [3D window](#) ^[169] at the place of the horizontal line 2 horizontal lines will be displayed.

Default minimal and maximal heights of the lines are determined by the [line type](#) ^[186], which constructs the horizontal line. The heights can be set separately for each horizontal line by means of [current construction parameters panel](#) ^[146], on which it is also possible to set coordinates of the

horizontal line in numeric values.

See also: ["Constructions" button group](#)^[90]

Vertical line

When this button is pressed, clicking on the [graphics area](#)^[75] specifies a point through which a **vertical line** is passes.

The [status bar](#)^[142] displays the **distance** from the [origin of coordinates](#)^[118].

In the [3D window](#)^[169] at the place of the vertical line 2 horizontal lines will be displayed.

Default minimal and maximal heights of the lines are determined by the [line type](#)^[186], which constructs the vertical line. The heights can be set separately for each vertical line by means of the [current construction parameters panel](#)^[146], on which it is also possible to set coordinates of the vertical line in numeric values.

See also: ["Constructions" button group](#)^[90]

Line segment

When this button is pressed, the first clicking on the [graphics area](#)^[75] specifies the start point of a **line segment**. Second clicking specifies the end point of the **line segment**.

The [status bar](#)^[142] displays the segments length and its projection to distance and height. Both clicks are to be made in the same projection. If the projections are different the measured values are incorrect, therefore when constructing a segment with its ends in different projections the values are not displayed in the **status bar**. In this case when changing a drawing the segment is attached to the projection with its **initial point** in it.

In the [3D window](#)^[169] a vertical rectangle will be displayed at the segment place.

Default minimal and maximal heights of the rectangle are determined by the [line type](#)^[186], which constructs the line segment. The heights can be set separately for each line segment by means of [current construction parameters panel](#)^[146], on which it is also possible to set coordinates of the line segment in numeric values.

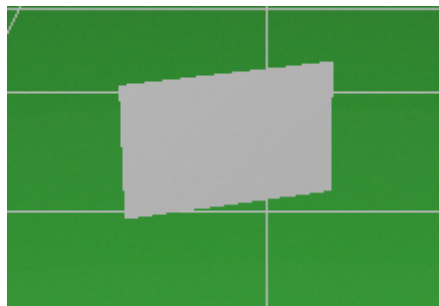
Color of the rectangle is determined only by [line type](#)^[186], which is used at constructing.

On the **current construction parameters panel** it is possible to set and fix **parameters of the segment**: coordinates of the first and second points, length, angle.

*A segment can be also used to **measure distances** on layouts without clicking for the second time in this case.*

*Line segments can be used for modeling cables with subsequent cable length calculation. Use separate **line types** to draw each cable type. For length calculation use the [Length calculation of line segments](#)^[208] tool.*

See also: ["Constructions" button group](#)^[90]



Polyline

This tool allows to draw line segments continuously. The end of each segment is the start of the next one. To stop drawing lines, press **ESC**.

In other respects this tool equals to the [Line segment](#)^[92] (see. above).

See also: ["Constructions" button group](#)^[90]

Angle

When this button is pressed, the first clicking on the [graphics area](#)^[75] specifies the **vertex** of an **angle**. Second and third clicking specify its **arms**.

The [status bar](#)^[142] displays the angle value in **degrees**.

If the angle **vertex** and **arms** are constructed in **different projections**, when changing drawing the angle is attached to the projection with its vertex.

In the [3D window](#)^[169] 2 vertical rectangles will be displayed at the angle place.

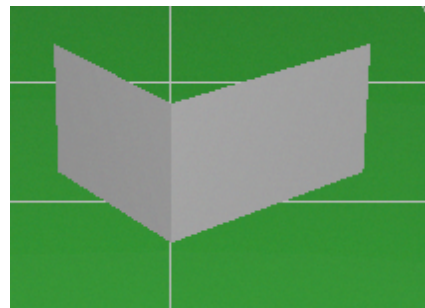
Default minimal and maximal heights of the rectangles are determined by the [line type](#)^[186], which constructs the Angle. The heights can be set separately for each Angle by means of [current construction parameters panel](#)^[146], on which it is also possible to set coordinates of the line segment in numeric values.

Color of the rectangles is determined only by [line type](#)^[186], which is used at constructing.

On the **current construction parameters panel** it is possible to set and fix **parameters of the angle**: coordinates of the first, second, third points, length, angle value in degree.

The **angle** tool is also used to measure angles on layouts.

See also: ["Constructions" button group](#)^[90]



Rectangle

When this button is pressed, the first clicking on the [graphics area](#)^[75] specifies the first corner of a rectangle. Second clicking completes the rectangle construction.

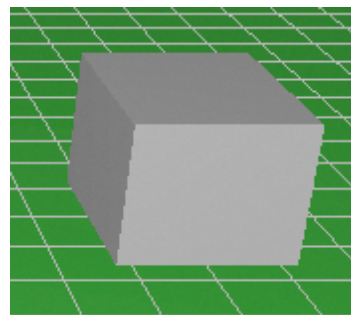
The [status bar](#)^[142] displays the information on the rectangle sizes and location.

In the [3D window](#)^[169] a parallelepiped will be displayed at the rectangle place.

Default minimal and maximal heights of the parallelepiped are determined by the [line type](#)^[186], which constructs the rectangle. The heights can be set separately for each rectangle by means of [current construction parameters panel](#)^[146], on which it is also possible to set coordinates of the rectangle in numeric values.

Color of the parallelepiped is determined only by [line type](#)^[186], which is used at constructing.

On the **current construction parameters panel** it is possible to set and fix **parameters of the rectangle**: coordinates of the first points, height, width.



Rectangles are also used for creating rectangular **horizontal planes** in the **3D window**, for example a ceiling or floor.

See also: ["Constructions" button group](#)^[90]

Inclined rectangle

When this button is pressed, clicking on the [graphics area](#)^[75] specifies first corner of an inclined rectangle.

Inclined rectangle is similar to a [rectangle](#)^[93] and differs from it that in [3D window](#)^[169] it is displayed in the form of **inclined rectangle**. The **minimal height of rectangle** corresponds to the **lower side** of this rectangle, and the **maximal height** - to the **upper one**.

In the **Graphics window** the upper side of inclined rectangle is displayed by **thick line**.

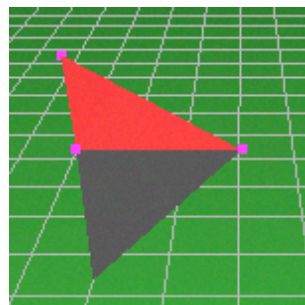
For modeling complex objects it is possible to [edit](#)^[87] inclined rectangle by points, moving its vertexes.

When moving separate vertexes press **Ctrl**.

Inclined rectangle can be made transparent by 70 %. For this purpose it is necessary to mark the **Transparency** checkbox on the [Current construction parameter panel](#)^[146].

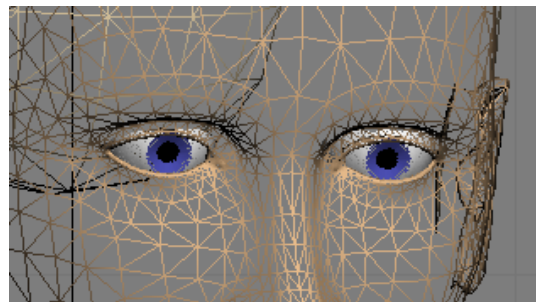
Inclined rectangle is very universal tool. Using the inclined rectangles it is possible to model any 3D objects.

It can be useful to combine inclined rectangles in pairs thus to get triangles with independent vertexes in the 3D space. Meanwhile two vertexes of each inclined rectangle must coincide. The rest two vertexes of first inclined rectangle must coincide with the other two vertexes of second inclined rectangle.



Using obtained triangles you can theoretically build any 3D surfaces, although it can be not simple in practice.

For example, all 3D models in VideoCAD consist of triangular mesh only.



See also: ["Constructions" button group](#)^[90]

Double line

When this button is pressed, the first clicking on the [graphics area](#)^[75] specifies the start point of a **double line**. Second clicking specifies the end point of the **double line**.

The **length** and the **width** of the double line appear in the [status bar](#)^[142].

In [line type panel](#)^[144] that appeared below **graphics area** there is a box in which it is possible to choose from the list or enter from keyboard the distance between lines of the double line.

Two buttons allow switching the **orientation of the second line** relatively to the first one

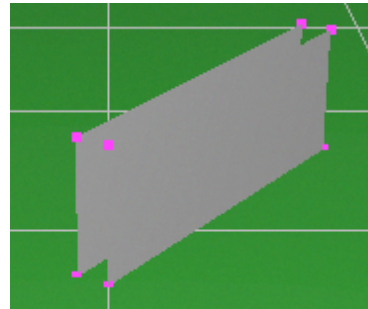


You can also switch the orientation quickly by pressing the **Space bar**.

In the [3D window](#)^[169] 2 vertical rectangles will be displayed at the double line place.

Default minimal and maximal heights of the rectangles are determined by the [line type](#)^[186], which constructs the double line. The heights can be set separately for each double line by means of [current construction parameters panel](#)^[146], on which it is also possible to set coordinates of the double line in numeric values.

Color of the rectangles is determined only by [line type](#)^[186], which is used at constructing.



On the **current construction parameters panel** it is possible to set and fix **parameters of the double line**: coordinates of the first, second points, length, angle.

See also: ["Constructions" button group](#)^[90]

Wall

The Wall tool is intended for drawing walls with specified thickness and height. In these walls you can make [apertures](#)^[96] of any shape, for example for doors and windows..

When this button is pressed, the first clicking on the [graphics area](#)^[75] specifies the start point of a **Wall**. Second clicking specifies the end point of the **Wall**.

The **length** and the **width** of the wall appear in the [status bar](#)^[142].

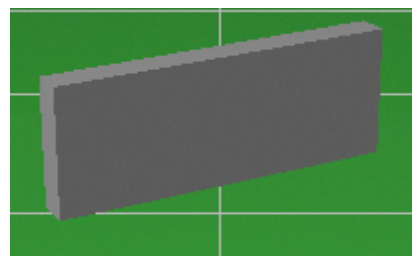
In [line type panel](#)^[144] that appeared below **graphics area** there is a box in which it is possible to choose from the list or enter from keyboard the thickness of the wall.

Two buttons allow switching the **orientation** of the second wall side relatively to the first one



You can also switch the orientation quickly by pressing the **Space bar**.

In the [3D window](#)^[169] a parallelepiped will be displayed at the wall place.
Default minimal and maximal heights of the wall are determined by the [line type](#)^[186], which constructs the wall. The heights can be set separately for each wall by means of the [current construction parameters panel](#)^[146], on which it is also possible to set coordinates of the wall in numeric values.



Color of the parallelepiped is determined only by [line type](#)^[186], which is used at constructing.

On the **current construction parameters panel** it is possible to set and fix **parameters of the wall**: coordinates of the first, second points, length, angle.

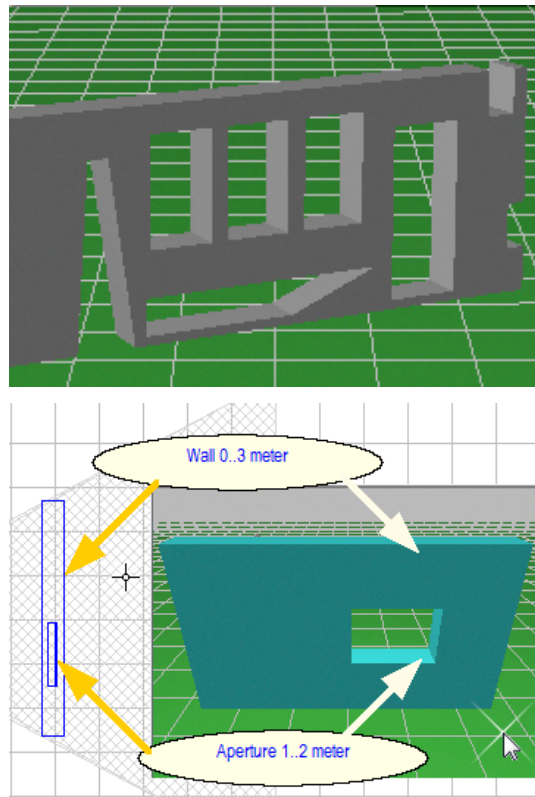
In walls it is possible to make apertures for doors and windows using the [Aperture in Wall](#)^[96] tool.

See also: "[Constructions](#)" [button group](#)^[90]

Aperture in Wall

The Aperture in Wall tool designed to easily create apertures (openings) of various shapes in the walls, built by the [Wall](#)^[95] tool.

In order to an aperture will appear in the 3D space, it must intersect the horizontal projection of the wall.



The Aperture in Wall tool is similar to the [Inclined rectangle](#)^[94] tool. But the **Inclined rectangle** creates a **flat rectangle** in 3D space, but the **Aperture in Wall** placed inside the **Wall**, cuts an aperture in the wall. This aperture equals to the projection of the same **flat rectangle** on the plane of the wall.

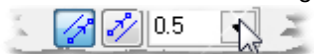
The **minimal height of aperture** corresponds to the **lower side** of this rectangle, and the **maximal height** - to the **upper one**.

In the **Graphics window** the upper side of aperture is displayed by **thick line**.

In [line type panel](#)^[144] that appeared below **graphics area** there is a box in which it is possible to choose from the list or enter from keyboard the thickness of the aperture.

The Thickness of the wall affects only the shape of aperture projection in the Graphics window. In the 3D window the apertures always cut through a wall at its full thickness.

Two buttons allow switching the **orientation** of the second aperture side relatively to the first one



You can also switch the orientation quickly by pressing the **Space bar**.

For modeling complex apertures it is possible to [edit](#)^[87] the Apertures by points, moving its vertexes.

*When moving separate vertexes press **Ctrl**.*

You can create complex apertures using several intersecting apertures.

See also: [Wall](#)^[95], ["Constructions" button group](#)^[90]

Circle

When this button is pressed, the first clicking on the [graphics area](#)^[75] specifies the **center of a circle**. Second clicking completes the **circle** construction.

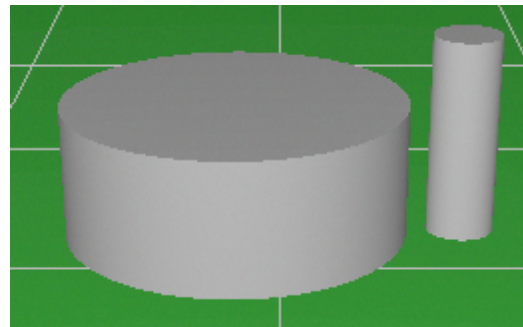
The [status bar](#)^[142] displays the information on the sizes and location of the circle.

To switch the **circle** into the **editing state** you need to double-click on **its center** or on the **point on its radius** that appears during the process of construction.

In the [3D window](#)^[169] a cylinder will be displayed in the circle place.

Default minimal and maximal heights of the cylinder are determined by the [line type](#)^[186], which constructs the circle. The heights can be set separately for each circle by means of [current construction parameters panel](#)^[146], on which it is also possible to set coordinates of the circle in numeric values.

Color of the cylinder is determined only by [line type](#)^[186], which is used at constructing.



On the **current construction parameters panel** it is possible to set and fix **parameters of the circle**: coordinates of the center and second point, radius, angle.

See also: ["Constructions" button group](#)^[90]

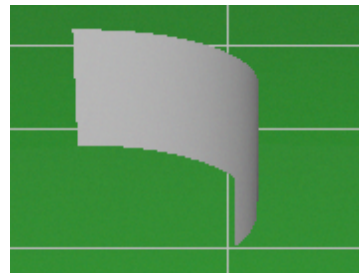
Arc

When this button is pressed, the first clicking on the [graphics area](#)^[75] specifies the **center** of an **arc**. Second and third clicking specify its **ends**.

To switch the arc into the **editing state** you need to double-click on **its center** or on either of its two ends.

In the [3D window](#)^[169] the arc stretches, creating a cylindrical surface.

Default minimal and maximal heights of the cylindrical surface are determined by the [line type](#)^[186], which constructs the arc. The heights can be set separately for each arc by means of [current construction parameters panel](#)^[146], on which it is also possible to set coordinates of the arc in numeric values.



Color of the arc is determined only by [line type](#)^[186], which is used at constructing.

On the **current construction parameters panel** it is possible to set and fix **parameters of the arc**: coordinates of the center, first and second points, radius, angle.

See also: ["Constructions" button group](#)^[90]

Text

When this button is pressed, clicking on the [graphics area](#)^[75] specifies the place for a text string. At this point a **pop-up frame** with cursor will appear.

The necessary text is to be entered within a frame. To separate the lines use **Enter**.

The [font type panel](#)^[145] appears below in the graphics area allowing to change the [font type](#)^[188]. A **pop-up menu** is available within a frame, appearing at clicking the right mouse button.

The entered text is a text marker and can be quickly found using the [Find text](#)^[120] tool. This is a very convenient and quick means for navigation on big layouts.

See also: ["Constructions" button group](#)^[90], [Find text](#)^[120]

Mask

When this button is pressed, the first clicking on the [graphics area](#)^[75] specifies the first vertex of **rectangular mask**. Second clicking completes the mask construction.

The [status bar](#)^[142] displays the information on the mask sizes and location.

Using **masks** allows to cover any image parts. [Constructions](#)^[90] and [texts](#)^[98] can be drawn over masks.

To cover **separate construction fragments** you can also use **line of white color**.

In the **3D window** masks are not shown.

See also: ["Constructions" button group](#)^[90]

Filling

Filling is similar to a [mask](#)^[98], but can be of any color, and also in the form of **different hatch type**. Color of filling is defined by the **color of line type**, by which the filling is made, and **type of hatching** or its absence - by **style of this line type**.

Fillings, as well as other objects, could be [edited](#)^[87] by moving separate vertexes, and thus could be stretched on various objects.

In the **3D window** fillings are not shown.

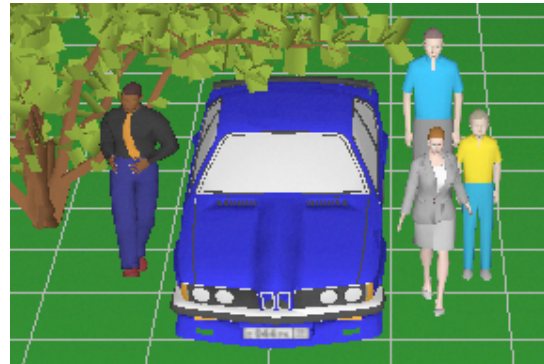
See also: ["Constructions" button group](#)^[90]

3D model

The button opens submenu, in which there are **3D models** which are present in the program library.

When any item in the submenu is chosen, clicking in the [graphics area](#)^[75] specifies the place for a **3D model**.

3D models placement is possible in the horizontal and vertical projections, however only 3D models placed in **the horizontal projection** will be visible in the [3D window](#)^[169].



In the horizontal projection the **3D models** are displayed in the **top view**, in the vertical projection - in the **side view**, and in the [3D window](#)^[169] models are as **3D objects**.

3D models can be **moved**, **rotated**, **copied**, changed [draw order](#)^[135] as other VideoCAD objects.

The default **height of the 3D models** above the ground is determined by the **maximal height of the line type**^[186] which was chosen when the **3D model** was being placed. The height can be set separately for each **3D model** using the [current construction parameters panel](#)^[146].

To change **3D model height** above the ground, [select](#)^[131] the **3D model**, then [change line type](#)^[136] or switch the **3D model** to editing state by double clicking on it and change value in the **3D H** box on the **Current construction parameters panel**.

By default the **3D models** are on the ground and constructed by the **line type** with the number, specified on the [Lines](#)^[186] tab of the [Options box](#)^[185]. This line type has the **maximum height equal to 0**.

*Heights can also take on **negative values**, in this case **3D model plunges under ground**.*

*For example, **to place a 3D model on a surface**: construct the surface by the [rectangle](#)^[93] tool using **line type** with the required maximum height, place the **3D model** on it, and then change **3D model line type** to the line type of the surface.*

On the **Current construction parameters panel** you can resize **3D models** separately on axes. To do this, enter new values into X, Y, Z boxes during **3D model** editing. If the  box is marked, change of any size leads to proportional change of other sizes, thus model proportions are not broken. **3D model height above the ground** is displayed and can be changed in **3D H** box.

License plate of cars

Let's consider 3D models - cars with license plates. License plate type, the same for all car models, is determined by the file **number.bmp** file in the directory **\Models**, and the **plate size** - by the corresponding settings in the **Options box** on the [3D modeling](#)^[192] tab. This opportunity allows using the same models in different countries with different license plates.

To make cars appear in the 3D window with the license plate of your country:

- create a ***.bmp** file with the image of you license plate;
!! The size of file sides, in pixels, must be equal to powers of two:
16,32,64,128,256,512,1024,2048
- replace the file **number.bmp** by your file;
- specify the sizes of your license plate in the **Options box**.

Adding new 3D models to the library

3D model files themselves are in the folder **Models** in the VideoCAD installation directory. To add new 3D models to the program just copy the new model files into this directory.

You can import 3D models from Google SketchUp and Autodesk 3ds max. See: [Importing 3D models from Google SketchUp and Autodesk 3ds Max](#) ^[255]

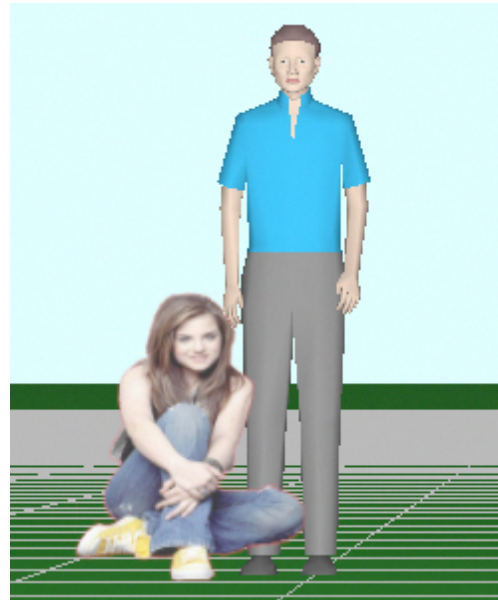
See also: [3D window](#) ^[169], [Options box>Lines](#) ^[186], [Options box>3D modeling](#) ^[192]

3D image

This tool is similar to [Inclined rectangle](#) ^[94]. As well as the **inclined rectangle** it allows to place a rectangle in three-dimensional space at any angle.

But this rectangle can be "covered" by any raster image in *.bmp or *.jpg formats. The image can be a photo or a figure. Pixels of the image can be transparent if they have a color **coincided** with the **color of the left bottom pixel**. Thus the image border can take any form.

In many cases raster images can replace [3D models](#) ^[98] which are difficult to make. They can be used for modeling many objects from banknotes and plates up to a complex background.



After choosing this button the **Loading 3D image** dialog box appears. After choosing a file in *.bmp or *.jpg format place **3D image** in the same way as Inclined rectangle.

On the [Current construction parameter panel](#) ^[146] the minimal height corresponds to the bottom bound of this rectangle and the maximal height - to the top bound.

In the **Graphics window** the top of 3D images is displayed by **thick line**.

Later **3D image** can be [edited](#) ^[87] by moving its grips. It is possible to change **3D image** sizes on the Current construction parameter panel, delete and change the image file using buttons  and  on the **Current construction parameter panel**.

To make transparent pixels with color **coincided** with **color of left bottom pixel**, check **Transparence box** on the **Current construction parameter panel**.

*To get the transparence the image file has to be specially prepared by means of any graphic editor, for example **Paint**. **Pixels that should become transparent have to be filled by color that coincides with the color of left bottom pixel.***

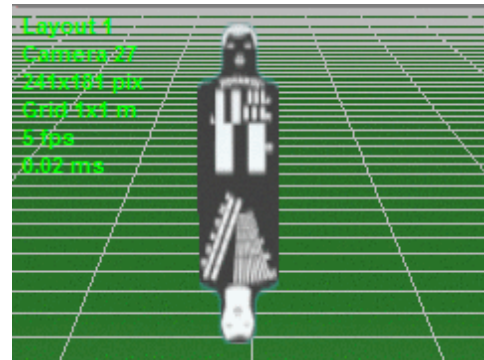
See also: ["Constructions" button group](#) ^[90]

Rotakin

Rotakin - an animated rotating test target for visual estimation of spatial resolution and motion distortions on the 3D images.

In the **horizontal plane** the Rotakin automatically turns towards the [Active camera](#) ^[78].

In the **vertical plane** the Rotakin rotates with a specified speed about an axis passing through its center (in Professional version only).



To place the Rotakin specify a place for the Rotakin by clicking.

On the **current construction parameters panel** it is possible to set minimal and maximal heights of the Rotakin.

*Rotating test target named **Rotakin** is used in field testing of video surveillance systems by the techniques developed by the **Home Office Scientific Development Branch 'Performance Testing of CCTV Perimeter Surveillance Systems (Using the Rotakin Standard Test Target)'**. The Rotakin model meets the requirements of the document.*

See also: ["Constructions" button group](#) ^[90]

Signal cable

When this button pressed, you can draw the **signal cable** of the [Active camera](#) ^[78] by successive clicks in the **graphics area**. The end of each segment is the start of the next one. To stop drawing cable, press **ESC**.

The [status bar](#) ^[142] displays the segment length and its projection to distance and height.

Both clicks are to be made in the **same projection**. If the projections are different the measured values are incorrect, therefore when constructing a segment with its ends in different projections the values are not displayed in the **status bar**. In this case when changing the drawing the segment is attached to the projection with its **initial point**.

A cable consists of **segments**, allowing to draw it in different projections and layouts, representing an actual scheme of laying accurately.

When [copying](#) ^[89] the **cable segments** between **cameras** and [layouts](#) ^[204] a process of cable drawing is accelerated considerably even in complex CCTV systems.

When drawing a cable the menu item [Cable laying](#) ^[138] might be used. When choosing it a float panel of the same name appears enabling to choose a shift of segment ends for a level parallel cable drawing along the walls, columns etc.

The type and parameters of **line designating the Signal cable** can be changed in the [options box](#) ^[186].

VideoCAD summarizes the lengths of all the segments, considers the **reserves** and calculates the **total length of cable**. To change the default parameters and obtain the calculation results double-click the image of any cable segment or click **Signal cable** again.

A dialog box of the same name appears after that.

The results of the cables' calculation on each individual camera and on the project as a whole are included into the text file obtained by [Export to text](#)^[107] and [Cable report](#)^[139].

It is possible to use [Line segments](#)^[92] for cable modeling with subsequent cable length calculation. Use separate [line types](#)^[186] for drawing a cable of each type. For length calculation use the [Length calculation of line segments](#)^[208] tool and the [Cable report](#)^[139].

See also: "[Constructions](#)" button group^[90], [View>Active camera cables](#)^[117], [View>All camera cables](#)^[117], [Cable laying](#)^[138], [Length calculation of line segments](#)^[208], [Cable report](#)^[139].

— Power cable

When this button pressed, you can draw the **power cable** of the [Active camera](#)^[78] by successive clicks in the **graphics area**. The end of each segment is the start of the next one. To stop drawing cable, press **ESC**.

The [status bar](#)^[142] displays the segment length and its projection to distance and height.

Both clicks are to be made in the **same projection**. If the projections are different the measured values are incorrect, therefore when constructing a segment with its ends in different projections the values are not displayed in the **status bar**. In this case when changing a drawing the segment is attached to the projection with its **initial point**.

A cable consists of **segments**, allowing to draw it in different projections and layouts, representing an actual scheme of laying accurately.

When [copying](#)^[89] the **cable segments** between **cameras** and [layouts](#)^[204] a process of cable drawing is accelerated considerably even in complex CCTV systems.

When drawing a cable the menu item [Cable laying](#)^[138] might be used. When choosing it a float panel of the same name appears enabling to choose a shift of segment ends for a level parallel cable drawing along the walls, columns etc.

The type and parameters of **line designating the power cable** can be changed in the [options box](#)^[186].

VideoCAD summarizes the lengths of all the segments, considers the **reserves** and calculates the **total length of cable**. To change the default parameters and obtain the calculation results double-click the image of any cable segment or click **Power cable** again.

A dialog box of the same name appears after that enabling to choose a **cross-section area of power cable** to fit the requirements of **camera voltage supply**. It is assumed that the conductor material is **copper** and the conductor temperature is **+ 50° C**

The results of the cables' calculation on each individual camera, each individual section area and on the project as a whole are included into the text file obtained by [Export to Text](#)^[107] and [Cable report](#)^[139].

It is possible to use [Line segments](#)^[92] for cable modeling with subsequent cable length calculation. Use separate [line types](#)^[186] for drawing a cable of each type. For length calculation use the [Length calculation of line segments](#)^[208] tool, [Cable report](#)^[139].

See also: "[Constructions](#)" button group^[90], [View>Active camera cables](#)^[117], [View>All camera cables](#)^[117], [Cable laying](#)^[138], [Length calculation of line segments](#)^[208], [Cable report](#)^[139].

* Global snaps

This button is used to promptly switch [global snaps](#)^[131] on/off.

Snaps enhance the convenience in drawing. As a result of the snaps' functioning the cursor "sticks" to the certain **points**, **lines** or **directions**.

- **Points** - the cursor sticks to base object points.
- **Lines** - the cursor sticks to objects lines.
- **Angular** snap functions at construction of line segments, angles, cables, and at moving and rotating as well. After that the subsequent construction points are leveled from the previous points horizontally and vertically.
- **Extension** - the cursor sticks to the virtual horizontal and vertical lines passing through base objects points.

The *snap Extension* is disabled for [hidden](#)^[135] objects and in the [Select/Edit](#)^[87] mode.

- **At grid** - the cursor sticks to grid nodes.

In the pop-up menu you can choose permanent opened **snap panel**, with the help of which it is convenient fast switch the snaps during drawings.

In the [Options box](#)^[198] you can change **snap sensitivity**.

"Active camera" control element group

Change installation height

When this button is pressed, clicking in a **vertical projection** specifies a new **height of the Active camera**^[78] installation.

The value of [camera installation height](#)^[154] in the [Camera Geometry box](#)^[152] changes according to the clicked point height.

Change view area upper bound

When this button is pressed clicking in a **vertical projection** specifies a new [height of the view area upper bound](#)^[155] and new [distance up to the view area upper bound](#)^[155].

Clicking in the **horizontal projection** specifies a **distance up to the view area upper bound** only. The values of correspondent parameters in the [Camera Geometry box](#)^[150] change to clicked point coordinates.

You can change view area upper bound in the [Select / Edit](#)^[87] mode, by moving the grip in the middle of the view area upper bound.

Change view area lower bound

When this button is pressed clicking in a **vertical projection** specifies a new **height of the view area lower bound**. The values of [view area lower bound height](#)^[155] in the [Camera Geometry box](#)^[150] change according to a clicked point height.

"Scale" button group

Move drawing

When this button is pressed you can move a drawing within the [graphics area](#)^[75] using the mouse.

To do that press and hold down the **left mouse button** at any spot of drawing and then move the mouse holding the button down. To stop moving the drawing release the mouse button.

If your mouse is an **Intellimouse** or other **Wheel mouse** you can move the drawing at any time by pressing and holding the **middle button** down.

When [Alt is pressed](#)^[148], it is possible to move drawing in the Graphics window using arrow keys and change scale using plus and minus keys irrespective of the input focus.

Zoom IN/Zoom OUT

Clicking these buttons increases or reduces a **drawing scale** correspondingly.

Using the **Intellimouse** or other **Wheel mouse** you can change the **drawing scale** with the simultaneous zooming in the drawing sections pointed by the cursor.

If **Ctrl is not pressed** at changing the scale, then **the scale changes roughly** which is convenient at navigation. If **Ctrl is pressed, the scale changes with the less step** which is convenient for the precise drawing positioning before printing, saving or exporting.

If input focus is on the graphics area, scale can be changed by + and - buttons on the keyboard.

When [Alt is pressed](#)^[148], it is possible to move drawing in the Graphics window using arrow keys and change scale using plus and minus keys irrespective of the input focus.

"Undo" button group

UNDO

Undo the last operation.

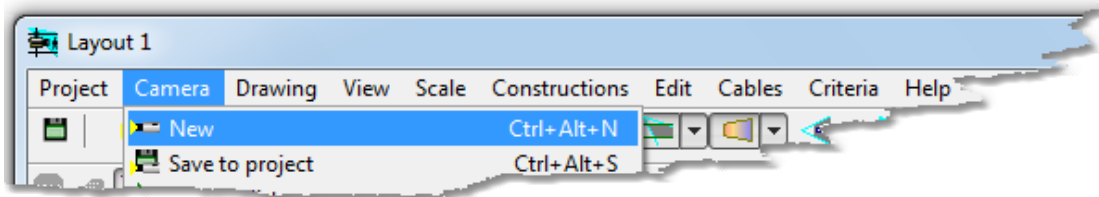
VideoCAD stores several **last operations including Undo operation**. When clicking this button successively VideoCAD retraces to the last states and a state before the button **Undo** was clicked for the first time.

The quantity of the stored operations can be adjusted in the Options box>Miscellaneous>[UNDO depth](#)^[198].

REDO

Redo the last operation undone by the [UNDO](#)^[104] tool.

7.1.3 Main menu



See [Main menu location](#)^[74].

Menu items substantially duplicate the buttons of the [tool bar](#)^[80]; however, there are certain advanced tools.

[Keyboard shortcuts](#)^[190]^[148] can be assigned to each menu item.

• Project

[New](#)^[107]
[Open](#)^[107]
[Save](#)^[107]
[Save as](#)^[107]
[Export to Text](#)^[107]
[Import from VideoCAD3..6](#)^[108]
[Export to VideoCAD3..6](#)^[108]
[Exit](#)^[108]

• Camera

[New](#)^[108]
[Save to project](#)^[109]
[Camera list](#)^[109]
[Numerate cameras](#)^[109]
[Change installation height](#)^[109]
[Change view area upper bound](#)^[109]
[Change view area lower bound](#)^[109]
[Move active camera name](#)^[110]

• Drawing

[Save as](#)^[110]
[Copy to clipboard](#)^[111]

• View

[View area edges](#)^[114]
[View area projections bounds](#)^[114]
[Fill projections](#)^[115]
[Spatial resolution](#)^[115]
[3D view area](#)^[116]
[Titles](#)^[117]
[Camera names](#)^[117]
[Active camera cables](#)^[117]
[All cameras' cables](#)^[117]
[Cameras over constructions](#)^[117]
[Camera Geometry](#)^[118]
[Spatial resolution](#)^[118]
[3D window](#)^[118]
[Monitor window](#)^[118]
[Hide vertical projection](#)^[118]
[Hide horizontal projection](#)^[118]
[Grid](#)^[118]
[Origin](#)^[118]
[Set origin](#)^[119]
[Black-and-white](#)^[119]
[Options](#)^[119]

• Scale

• Constructions

[Point](#)^[120]
[Horizontal line](#)^[121]
[Vertical line](#)^[121]
[Line segment](#)^[121]
[Polyline](#)^[122]
[Angle](#)^[122]
[Rectangle](#)^[123]
[Inclined rectangle](#)^[123]
[Double line](#)^[124]
[Wall](#)^[125]
[Aperture in Wall](#)^[125]
[Circle](#)^[126]
[Arc](#)^[127]
[Text](#)^[127]
[Mask](#)^[128]
[Filling](#)^[128]
[3D model](#)^[128]
[3D image](#)^[129]
[Rotakin](#)^[130]
[Global snaps](#)^[131]
[Lock constructions](#)^[131]

• Edit

[Select all](#)^[131]
[Select/Edit](#)^[131]
[Cut](#)^[133]
[Copy](#)^[133]
[Cut with base point](#)^[133]
[Copy with base point](#)^[134]
[Paste](#)^[134]
[Move](#)^[134]

• Edit

[Bring to front](#)^[135]
[Send to back](#)^[135]
[Hide](#)^[135]
[Align](#)^[136]
[Change Line type](#)^[136]
[Combine to block](#)^[136]
[Destroy block](#)^[136]
[Undo](#)^[136]
[Redo](#)^[136]
[Erase](#)^[137]
[Erase all](#)^[137]

• Cables

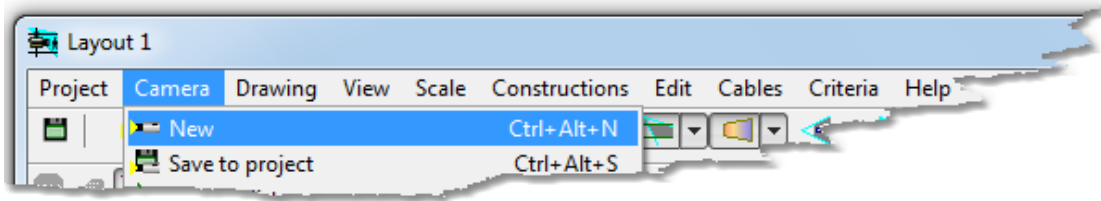
[Signal cable](#)^[137]
[Power cable](#)^[138]
[Cable laying](#)^[138]
[Length calculation of line segments](#)^[138]
[Cable report](#)^[139]

• Help

[About VideoCAD](#)^[139]
[Help Contents](#)^[139]
[Language](#)^[139]
[Homepage](#)^[140]
[Order](#)^[140]
[User forum](#)^[140]
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[Load background](#)111[Scale](#)[background](#) 111[Move](#)[background](#) 112[Hide background](#)112[Delete](#)[background](#) 112[Background only](#)112[Layouts](#) 112[Printer setup](#) 112[Print](#) 113[Zoom in](#) 119[Zoom out](#) 119[Move drawing](#) 107[Show all](#) 120[Find text](#) 120[Rotate](#) 134[Scale](#) 135[Mirror](#) 135

7.1.3.1 Menu items



See [Main menu location](#)^[74].

Menu items substantially duplicate the buttons of the [tool bar](#)^[80]; however, there are certain advanced tools.

[Keyboard shortcuts](#)^[190]^[148] can be assigned to each menu item.

Project > New

Create new project.

A project may contain unlimited number of cameras and up to **10 layouts**^[112].

In the New project dialog box type the **new project name**.

You can change the **format of measurements** in new project when necessary: **Metric** (meters, millimetres) or **Imperial** (feet, inches).

Project > Open

Open earlier saved project.

Choose a project file. If the current project was not saved, VideoCAD offers to save it.

Project > Save

Save project to a file.

If a project is saved for the first time, the dialog box **Save as** appears enabling to change a project **filename** and a saving directory when needed.

Project > Save as

Save project to a file under another name or in another directory.

In the appearing dialog box choose a filename and a directory to save it.

The project includes all information on the program settings (line types, fonts, etc.).

Project > Export to Text

Export the data on most of the **specified** and **calculated** parameters of cameras and **cables** included into the current project to a text file.

Enter a filename. A default filename coincides with the **project name**.

When clicking **OK**, the text document obtained is automatically loaded into a **text editor** for viewing and editing.

You can copy and paste the text obtained into a project explanatory note.

All parameters of cameras in the project can be obtained in the form of adjustable table which can

be exported into various formats.

Project > Import from VideoCAD3..6

Import of the previous project format ***.vmp**, supported by VideoCAD versions from 3 to 6.. In the appearing dialog box choose a filename with ***.vmp** extension.

If after importing project seems incorrectly, - restart VideoCAD.

Project > Export to VideoCAD3..6

Export current project to the previous project format ***.vmp**, supported by VideoCAD versions from 3 to 6.. In the appearing dialog box choose a filename with ***.vmp** extension.

***.vmp** file can contain no more than 100 cameras and no more than 5000 constructions on each layout. All that exceeds these limits, will be lost. Also new tools which appeared in VideoCAD7 will not be saved.

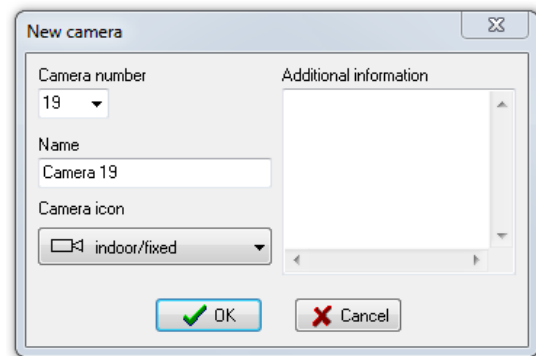
Project > Exit

Exit the program.

Camera > New

Create **new camera** with default parameters.

In the dialog box appeared you can change **camera number**, **name**, type of the camera which determines the kind of icon by which it will be displayed. If necessary, you can enter **additional information** on the created camera (for example: purpose, a place and features of installation).



Later it is possible to change name, number, type of the camera and the additional information in the [Camera list](#)^[200] box.

Cameras can be numerated sequentially with the help of the [Numerate cameras](#)^[109] tool.

Cameras are displayed by different icons only if the Display camera type box in the [Options box](#)^[185] is marked.

On the [Line type panel](#)^[144] it is possible to choose [line type](#)^[186] by which the icon of the camera and [View area projection bounds](#)^[83] will be drawn. When displaying [spatial resolution](#)^[84] is disabled, projection will be [filled](#)^[83] (hatched) by the color of assigned line type. Later it is possible to change line type using [Change line type](#)^[136] tool.

After entering all necessary data click **OK**, to cancel the operation click **Cancel**.

If there is already a camera with chosen number in the current project, VideoCAD will ask to specify, whether you would like to rewrite it.

After camera creation specify by clicking a place for the new camera on the layout.

Just after camera creation the moving mode will be switched on. When placing will be completed, click  [Select/Edit](#)^[87] button or press **ESC**.

It is convenient to create new cameras with already set parameters by [copying](#)^[89] and [pasting](#)^[89] existing ones.

Camera > Save to project

All the **specified** and **calculated parameters** of the active camera and layout are saved to the current project.

Saving is performed automatically at many operations.

Camera > Camera list

Clicking this button opens **Camera list box**, in which camera list of current project is displayed. **Active camera** is highlighted by **red frame**. Any camera can be activated, removed, renamed, found on layouts, it is possible to show 3D image from any camera. It is also possible to sort cameras in the list. For carrying out any manipulations with the camera first select its name in the list by single clicking.

See more: [Camera list](#)^[200]

Camera > Numerate cameras

Open the [Numerate cameras](#)^[202] tool. This tool allows renaming and serial numeration any quantity of cameras simultaneously.

See more: [Numerate cameras](#)^[202]

Camera > Change installation height

When this button is pressed clicking in a **vertical projection** specifies a new **height of the [Active camera](#)**^[78] **installation**.

The values of [camera installation height](#)^[154] in the [Camera Geometry box](#)^[152] change according to a clicked point height.

Camera > Change view area upper bound

When this button is pressed clicking in a **vertical projection** specifies a new [height of the view area upper bound](#)^[155] and new [distance up to the view area upper bound](#)^[155].

Clicking in a **horizontal projection** specifies a **distance up to the view area upper bound**. The values of correspondent parameters in the [Camera Geometry box](#)^[150] change to clicked point coordinates.

You can change view area upper bound in [Select / Edit](#)^[87] mode, by moving the the grip in the middle of the view area upper bound.

Camera > Change view area lower bound

When this button is pressed clicking in a **vertical projection** specifies a new **height of the view area lower bound**. The values of [view area lower bound height](#)^[155] in the [Camera Geometry box](#)^[150] change according to a clicked point height.

Camera > Move active camera name

When this item chosen, clicking in the [graphics area](#)^[75] specifies **new location of the active camera name** relatively to its icon **in the projection which you clicked**.

If the Options box>Camera icon>Camera Icon>[Scalable](#)^[194] **is not checked**, then the size of the camera icon is not scalable so the distance up to the name also cannot be scalable. The distance is saved in pixels.

If the **Scalable is checked**, then the size of the camera icon is scalable so the distance up to the name is scalable too. The distance is saved in meters(foot).

Scalable and unscalable positions are stored separately, so switching the Scalable box will not lead to losing of the saved positions of the camera name.

Drawing > Save as

The item opens a submenu in which the **format of the saving drawing file** can be chosen. You may save the drawing in any of the following formats: ***.bmp, *.jpg, *.dxf (AutoCAD R14), *.dxf (AutoCAD R2000) *.wmf, *.emf, *.emf+, *.gif, *.tif, *.png**.

**.wmf format is very outdated, it does not support images of 3D models, semitransparent (blend) and gradient filling projections. *.emf format does not support gradient and blend filling.*

In AutoCAD formats (.dxf and *.dwg) only vector elements of the drawing are saved. Semitransparent, blend gradient filling of view areas is not saved, it can be saved in the form of hatching. When [shadows](#)^[107] calculation is enabled, hatching of view areas is not saved too.*

Clicking the item will open the [Export](#)^[195] tab in the [Options box](#)^[185]. It is possible on the tab to adjust export parameters: exporting drawing scale, camera icon and illuminator icon sizes, size of nonscalable fonts, step of dash line and step of hatches.

After closing the Options box the dialog box **Save drawing as** appears enabling to choose a **filename** and a **saving directory**.

The file name coincides with the layout name by default.

If the file format differs from ***.dxf**, then the drawing is saved in a **displayed size**.

On the [Export](#)^[195] tab in the [Options box](#)^[185] you can change image scale and other export parameters.

It is possible to save a drawing **together with the frame and the Title-Block**. For this choose the item [Print](#)^[113] and the required frame and save the drawing.

For more convenience of the following ***.dxf** file processing in **AutoCAD**, the file becomes **multi-layer**. In the obtained ***.dxf** file there are following layers:

- **Background**;
- **Constructions**;
- **Cameras**;
- **Additional** - grid, titles, horizontal line;
- **Frame** - the print frame with the **Title-Block** (if it is).

It is possible to change the **camera icons' size**, the **size of nonscalable fonts**, dotted line step and hatching step on the [Miscellaneous](#)^[192] tab in the **Options box**.

As ***.dxf** is a vector format, **bitmap objects** ([3D models](#)^[128] projections, bitmap [background](#)^[111]) **are saved as rectangles**.

When saving in *.dxf format it is recommended to make visible on the screen all cameras and constructions and, the active camera . In other case at a high magnification errors are possible.

Drawing > Copy to clipboard

Copy drawing to **Windows clipboard**.

Choosing this item opens a submenu allowing to choose the **format** in which the drawing will be copied to the clipboard.

After that a drawing can be pasted into any document, e.g. into a project explanatory note.
A drawing is copied in a displayed size.

Drawing > Load background

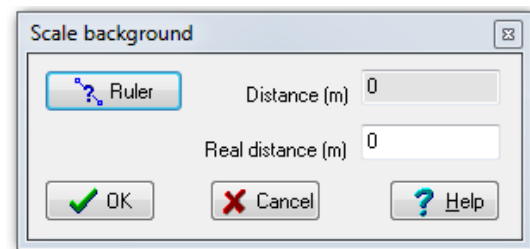
This item opens a submenu allowing to choose a **projection** to load a background.

After choosing item a **dialog box for choosing background file** appears. Graphic files of the following formats can be used as a **background**: *.bmp, *.jpg, AutoCAD *.dxf, *.dwg, *.wmf, *.emf, *.emf+, *.gif, *.tif, *.png.

Choose the necessary file in the dialog box and click **OK**.

The **background** will appear in the chosen projection along with the dialog box [Scale Background](#) [111]. Using its tools is necessary to bring an **image scale** on the background in correspondence with the **general VideoCAD scale**.

- Click the  **Ruler** button
- Specify by clicking **2 points on the background image**, the distance between which is known to you (e.g., the length of a building, a wall, etc.). In the **Distance** box the measured distance at the current scale will appear.
- Enter the known distance into the **Real distance** box and click **OK**.



The background will be automatically scaled so that the **distance specified by you** will be equal to the **entered value of real distance**.

If the background is **already loaded**, and you are loading a background without [removing](#) [112] the previous one, then the size, scale and location of a new background will remain the same as of a previous one. In this case, the proportion between the sides of a new background might be distorted.

If you **remove an old background beforehand**, then the new one will be automatically placed according to the size of a file and the current scale on the screen.

The project includes background files themselves, therefore when moving the project file don't worry about the background files moving.

Drawing > Scale background

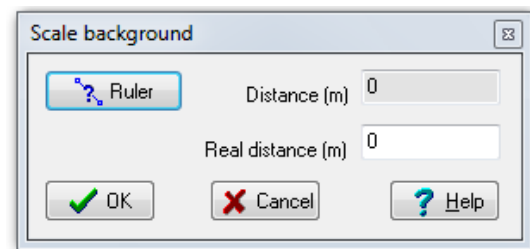
This item opens a submenu allowing to choose a projection to **scale** background.

After choosing item the dialog box **Scale Background** appears. Using its tools is necessary to bring an **image scale on the background** in correspondence with the **general VideoCAD scale**

Sequence of actions:

- Click the  **Ruler** button
- Specify by clicking **2 points on the background image**, the distance between which is known to you (e.g., the length of a building, a wall, etc.). In the **Distance** box the measured distance at the current scale will appear.
- Enter the known distance into the **Real distance** box and click **OK**.

The background will be automatically scaled so that the **distance specified by you** will be equal to the **entered value of real distance**.



Drawing > Move background

This item opens a submenu allowing to choose a projection to **move** background.

After choosing item clicking in the [graphics area](#)^[75] specifies **new location of the background in the corresponding projection**.

Drawing > Hide background

This item opens a submenu allowing to choose a projection to **hide** background.

The **hidden background** and all its parameters are stored in memory, but the background is not displayed. It is convenient for increasing speed on weak computer or in some other cases.

Drawing > Delete background

This item opens a submenu allowing to choose a projection to remove background.

Choosing item from the submenu removes **background** and all its parameters from the project.

Drawing > Background only

After choosing this item the background only will be displayed in the [graphics area](#)^[75].

VideoCAD turns to a handy **program for graphic files viewing and printing**.

For all the rest to be displayed choose this item again.

Drawing > Layouts

Choosing this item opens a box with the list of current project **layouts**.

The project may contain up to **10** layouts. Originally one layout is created into project.

See more. [Layout box](#)^[204]

To switch between layouts, create, delete, rename layouts in the Graphics window it is convenient to use the [Layouts tabs](#)^[141] in the lower left corner and the pop-up menu of these tabs.

Drawing > Printer setup

Choosing this item opens a standard dialog box of current printer setup in Windows.

Drawing > Print

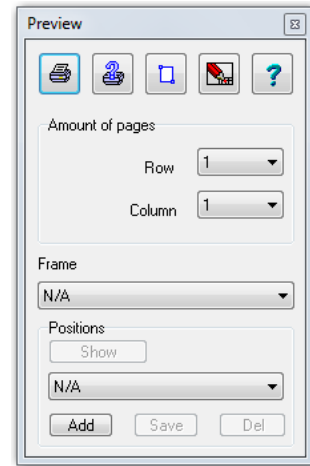
After choosing this item the **borders of pages for printing** and the **Preview** box appear in the **graphics area**.

In the box you can choose the **number of pages horizontally and vertically** to print out current drawing. The obtained pages can be glued together forming a drawing of a larger format.

Using the mouse, **position** and **scale** the drawing as needed. If **Ctrl** is not pressed at changing the scale, then the scale changes roughly which is convenient at navigation. If **Ctrl** is pressed, the scale changes with the less step which is convenient for the precise drawing positioning before printing or saving.

To exclude the certain areas of a drawing at printing, use the **Mask**  button that duplicates the [same button](#)^[98] on the **Tool bar**.

To change **settings of the current printer** click the **Printer Setup**  button.



After the drawing preparation is completed click the button **Print** .

Not all printers, especially virtual ones, support correct printing hatches, images of 3D models and blend, gradient filling. Distortion of these elements is not an error of VideoCAD.

Frames and Tittle blocks

To get the standard drawing sheet with the **frame** and the **Title-Block** choose the required frame in the **Frame** combo box. The frame should be created beforehand.

Frames are a files of **AutoCAD *.dxf** format. They can be created or edited using the **AutoCAD** or other program exporting to ***.dxf**. VideoCAD can be used too. Frame files are saved in the **\Frames** directory in the VideoCAD installation directory.

You may use the prepared frames with the filled Title Blocks, or you may fill the **Title Block** before printing.

To fill the **Title Block**:

- Click the **Fill Title-Block**  button. As a result the frame becomes fixed to other constructions and at navigation is moved and scaled together with them. Current drawing location and scale are memorized;
- With the help of the mouse enlarge the Title-Block area and fill the fields with the [text](#)^[127];
- Click the button **Title-Block** again. The drawing and frame will return to the memorized position.

Store positions of drawing

In the lower part of the panel there is the **Positions** area. By means of tools in this area it is

possible to store the adjustments and positions of the drawing, and then quickly return to the stored positions. This option is useful in case of repeated printing the same view after editing is carried out.

After adjustment of the drawing's position and frame, before print, click the **Add** button and enter any name of the position.

At printing the same view for returning to the stored position it is enough to select only the position's name in the combo box.

To return to position in the combo box after displacement click **Show** button.

To store new position under the name selected from the positions' list click **Save** button.

To delete the selected position click **Del** button.

View > View area edges

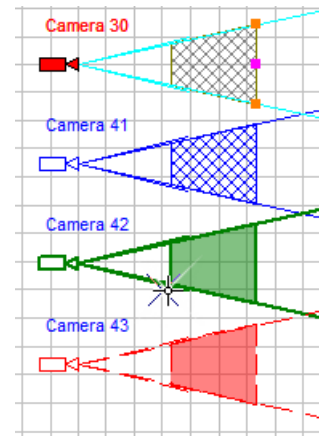
Show the active camera view area edges, calculated according to [parameters](#)^[152] in the **Camera Geometry** box.

Line type can be changed in the [options box](#)^[186].

If the [line type of camera](#)^[81] coincides with default line type for camera icons, specified in the Options box, then for this camera the line type of View area edges is taken from the Options box>Lines>System line types>[Bounds](#)^[186]. This line type is assigned to new cameras by default (Camera 30 on the figure).

If another line type was assigned to the camera, the View area edges of this camera is drawn by this line type assigned to the camera, as well as the [View area projection bounds](#)^[83] and camera icon. (Camera 41,42,43).

Thus you can draw different cameras and their view areas by different colors, thickness and line style.



A button state at the moment of camera saving determines whether the **view area edges** of the given camera will be displayed when this camera is inactive.

If selected cameras exist on the current layout, except the active camera, this button changes view  and operates the visibility of **View area edges** of all selected cameras simultaneously.

View > View area projection bounds

Show the bounds of the active camera view area projections calculated according to [parameters](#)^[152] in the Camera Geometry box.

Line type can be changed in the [options box](#)^[186].

If the [line type of camera](#)^[81] coincides with default line type for camera icons, specified in the Options box, then for this camera the line type of **View area projection bounds** is taken from the Options box>Lines>System line types>[Bounds](#)^[186]. This line type is assigned to new cameras by default.

If another line type was assigned to the camera, the **View area projection bounds** of this camera

is drawn by this line type assigned to the camera, as well as the [View area edges](#)^[83] and camera icon. (Camera 41,42,43).

A button state at the moment of camera saving determines whether the bounds of the given camera view area projections will be displayed when this camera is inactive.

If selected cameras exist on the current layout, except the active camera, this button changes view  and operates the visibility of **View area projection bounds** of all selected cameras simultaneously.

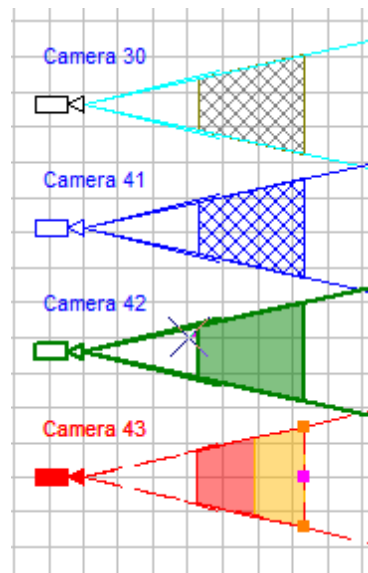
View > Fill projections

Hatch or fill by blend color view area projections of [active camera](#)^[78] (if these projections exist) calculated according to parameters in the [Camera Geometry](#)^[152] box.

If the [line type of camera](#)^[81] coincides with default line type for camera icons, specified in the Options box, then hatching (filling) projections of this camera is performed by grey color by default (Camera 30 on the figure).

If another line type was assigned to the camera, then hatching (filling) projections of this camera is performed by a color of this line type assigned to the camera. (Camera 41,42).

If the [Spatial resolution](#)^[84] is enabled, then colors of hatching (filling) projections is determined by Spatial resolution parameters (Camera 43).



Drop-down menu:

-  **Hatching** - hatch projections.
-  **Filling** - fill projections by blend semitransparent color.

If the **Hatching** item is chosen, but in the drop-down menu of the [Spatial resolution](#)^[84] button the **Gradient** item is chosen, then the projections will be hatched by a bold style of hatch without gradient.

- **Off** - don't hatch and fill view area projections.

A button state at the moment of camera saving determines whether the filling or hatching of the view area projections of the camera will be displayed when this camera is inactive.

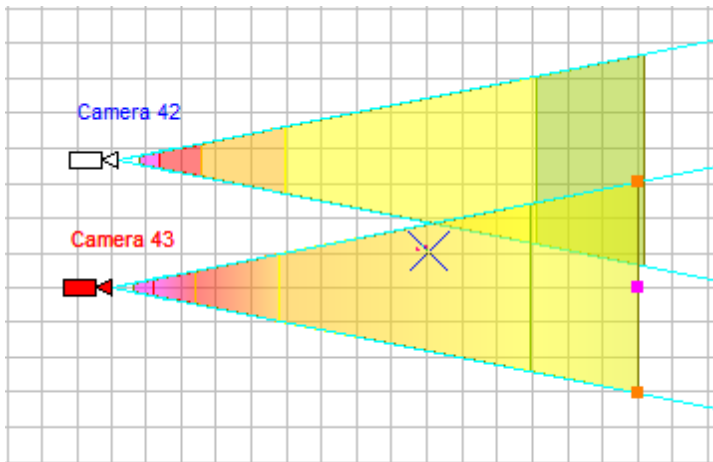
If selected cameras exist on the layout, except the active camera, this button changes view  and operates the visibility of filling (hatching) projections of all selected cameras simultaneously.

View > Spatial resolution

Fill in different colors **regions** on the **view area projections of the active camera**, depending on the **spatial resolution** within these regions.

Colors of the regions and the boundary values of the spatial resolution are determined by the **spatial resolution pattern** assigned to the camera.

In the [Spatial resolution box](#)^[158] you can edit the patterns and assign them to cameras.



Drop-down menu:

-  **Discrete colors** - fill the regions in discrete colors in accordance with a spatial resolution at the far bounds of the regions.
-  **Gradient** - fill the view area projection in gradient color according to the spatial resolution at each point on the projection.

*In case of gradient color is chosen, the colors at the **far region bounds** equal to the colors of the **spatial resolution pattern**, but between the bounds color changes smoothly, as well as real spatial resolution.*

Gradient reflects the spatial resolution more accurately and looks impressive, but discrete colors are more intuitive and easy to use..

*If the **Gradient** item is chosen, but in the drop-down menu of the [Fill projections](#)^[83] button the **Hatching** item is chosen, then the projections will be hatched by a bold style of hatch without gradient.*

- **Off**. - don't display spatial resolution.

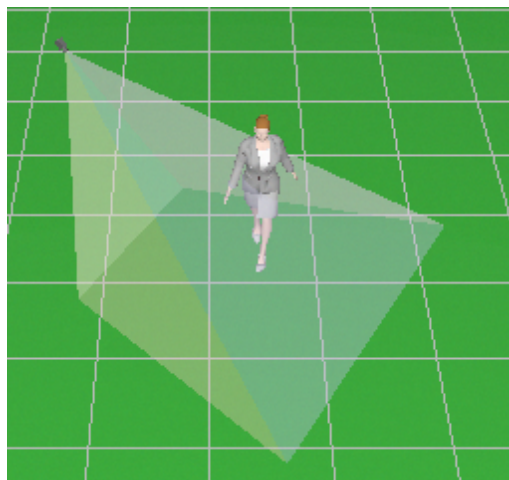
A button state at the moment of camera saving determines whether the spatial resolution of the camera will be displayed when this camera is inactive.

If selected cameras exist on the layout, except the [Active camera](#)^[78], this button changes view  and operates the visibility of spatial resolution of all selected cameras simultaneously.

See also: [Spatial resolution box](#)^[158], [Visualization of the camera control area projections and spatial resolution within them](#)^[240]

View > 3D view area

Display 3D translucent view area of the active camera in the [3D window](#)^[169]. Through other cameras it is possible to see view area of this camera from the side.



A button state at the moment of camera saving determines whether the 3D view area of the given camera will be displayed when this camera is inactive.

If selected cameras exist on the current layout, except the active camera, this button changes view  and operates the visibility of **3D view areas** of all selected cameras simultaneously.

*Displaying 3D view areas is disabled by default. It can be enabled on the **View** tab in the **Image parameter panel**.*

View > Titles

Show on the top left corner: **names of project and layout** and the **grid step** on the drawing.

Font type can be changed in the [Options box](#)^[188].

View > Camera names

Switch on/off the displaying cameras' names near their icons.

Font type can be changed in the [Options box](#)^[188].

View > Active camera cables

Show/Hide [cables](#)^[137] of the **active camera**.

View > All cameras' cables

Show/Hide the [cables](#)^[137] of all the cameras.

*Only cables of the **active camera** can be edited.*

View > Cameras over constructions

When this item is checked, cameras icons and view areas are displayed over constructions, i.e. the constructions do not cover the cameras. This mode is convenient at operation with complex 3D models of rooms.

When the item is not checked, the constructions are displayed over cameras (by default).

View > Camera geometry

Clicking this item will open [Camera Geometry box](#)^[150]. This box includes geometric parameters of the camera, lens and installation parameters of the camera.

See more: [Camera geometry box](#)^[150]

View > Spatial resolution

Show or hide the [Spatial resolution box](#)^[158]. In this box it is possible to create and edit patterns of spatial resolution and field of view size visualization. In the box there are prepared spatial resolution patterns according to the following criteria: Home Office Scientific Development Branch, Home Office Guidelines for identification, P 78.36.008-99. Also in the box there are examples of images of group of people are automatically displayed for each region of spatial resolution.

See more. [Spatial resolution box](#)^[158] [Spatial resolution button](#)^[84]

View > 3D window

Show or hide the **3D window**. The **3D window** displays the image from the active camera.

See more: [3D window](#)^[169]

View > Monitor window

Show or hide the **Monitor window**. In the Monitor window images from any quantity of cameras are displayed simultaneously. Monitor window allows modeling monitors of video surveillance system.

See more: [Monitor window](#)^[175]

View > Hide vertical projection

With this item chosen a **horizontal projection** is only present in the [graphics area](#)^[75]. To display a **vertical projection** click this item again.

View > Hide horizontal projection

With this item chosen a **vertical projection** is only present in the [graphics area](#)^[75]. To display a **horizontal projection** click this item again.

View > Grid

Choosing this item opens a submenu of **grid displaying control**. The submenu enables to set a certain grid step up, switch a mode of **automatic grid step selection** on/off and switch the grid displaying off.

See also: ["Grid" control element group](#)^[86]

View > Origin

This item opens the submenu of **origin selection**.

The [graphics area](#)^[75] allows to use **2 coordinate systems**:

- **Fixed coordinate system**
- **Float coordinate system attached to the active camera**

In case of the **fixed coordinate system**, the **origin of coordinates** does not vary when changing the active camera. The origin is displayed as two icons  in horizontal and vertical projections. It is possible to change a point of origin after choosing the menu item **View > Set origin**^[119].

In case of the **coordinate system attached to the active camera**, the **origin of coordinates** always coincides with the active camera location. It is convenient when studying its view area.

A **grid**^[86] is fixed to the **origin of coordinates**, and the counting of the cursor current coordinates in the **status bar**^[142] starts from the origin.

View > Set Origin

After choosing this item clicking on the **horizontal projection** sets up a new **origin**  of the **Fixed coordinate system**^[76].

In the vertical projection horizontally the Origin coincides with the one set in the horizontal projection, and vertically it coincides with the ground.

View > Black-and-white

Switch **black-and-white** drawing mode on/off.

This mode is useful when printing a drawing out on black-and-white printer.

View > Options

Choosing this item opens a dialog box of the **program options**^[185].

See more: [Options box](#)^[185]

Scale > Zoom in

Clicking this item increases a drawing **scale**.

Using the **Intellimouse** you can change the drawing **scale** with the simultaneous zooming in the image sections pointed by the cursor.

If **Ctrl is not pressed** at changing the scale, then the **scale changes roughly** which is convenient at navigation. If **Ctrl is pressed**, the **scale changes with the less step** which is convenient for the precise drawing positioning before printing or saving.

If input focus is on the graphics area, scale can be changed by + and - buttons on the keyboard.

When **Alt is pressed**^[148], it is possible to move drawing in the Graphics window using arrow keys and change scale using plus and minus keys irrespective of the input focus.

*Choosing an item of the pop-up menu appearing when clicking the **graphics area**^[75] with the right mouse button performs the command as well.*

Scale > Zoom out

Clicking this item reduces a drawing **scale**.

Using the **Intellimouse** you can change the drawing **scale** with the simultaneous zooming in the image sections pointed by the cursor.

If **Ctrl** is not pressed at changing the scale, then the **scale changes roughly** which is convenient at navigation. If **Ctrl** is pressed, the **scale changes with the less step** which is convenient for the precise drawing positioning before printing or saving.

If input focus is on the graphics area, scale can be changed by + and - buttons on the keyboard.

When [Alt is pressed](#)^[148], it is possible to move drawing in the Graphics window using arrow keys and change scale using plus and minus keys irrespective of the input focus.

Choosing an item of the pop-up menu appearing when clicking the [graphics area](#)^[75] with the right mouse button performs the command as well.

Scale > Move drawing

With this item chosen you can move a drawing within the [graphics area](#)^[75] using the mouse. To do that press and hold down the **left mouse button** at any spot of drawing and then move the mouse holding the button down. To stop moving the drawing release the mouse button.

If your mouse is an **Intellimouse** or other **Wheel mouse** you can move the drawing at any time by pressing and holding the **middle button** down.

When [Alt is pressed](#)^[148], it is possible to move drawing in the Graphics window using arrow keys and change scale using plus and minus keys irrespective of the input focus.

Scale > Show all

Show all cameras and other constructions on the current layout. At this the scale and view are chosen automatically.

Scale > Find text

After choosing this item the **Find text box** will appear. In the box **any text can be entered**.

After clicking the button **OK**, all cameras and [text markers](#)^[127] on the current layout, in which designation the entered text is included, will become **visible** and [selected](#)^[77]. At this the scale and view are chosen automatically.

Even only one letter can be entered, and at this all cameras and text markers on the current layout, in which designation the entered letter is included will become visible.

It is convenient to mark the upper left and the lower right corner of the required areas with **text markers**. After that as the result of searching the marked area will be displayed on the full screen.

When clicking the button **Save** the entered text string will be saved, and it will be enough later on just to choose it from the list to find the corresponding objects.

Text strings are saved in the project in separate lists for each layout, i.e. are saved between computer rebooting and project moves.

When clicking the button **Delete** the displayed text string will be deleted from the project.

Constructions > Point

When this button is pressed, clicking on the graphics area places a point.

The [status bar](#)^[142] displays the coordinates of this **point** relatively to the [origin of coordinates](#)^[118].

In the [3D window](#)^[169] the vertical segment will be displayed in the points place.

Default minimal and maximal heights of the segment are determined by the [line type](#)^[186], which constructs the point. The heights can be set separately for each point by means of the [current construction parameters panel](#)^[146], on which it is also possible to set coordinates of the point in numeric values.

See also: ["Constructions" button group](#)^[90]

Constructions > Horizontal line

When this button is pressed, clicking on the [graphics area](#)^[75] specifies a point through which a **horizontal line** is passes.

The [status bar](#)^[142] displays the line **height** or its **shift** from the [origin of coordinates](#)^[118] according to the projection being clicked.

In the [3D window](#)^[169] at the place of the horizontal line 2 horizontal lines will be displayed.

Default minimal and maximal heights of the lines are determined by the [line type](#)^[186], which constructs the horizontal line. The heights can be set separately for each horizontal line by means of [current construction parameters panel](#)^[146], on which it is also possible to set coordinates of the horizontal line in numeric values.

See also: ["Constructions" button group](#)^[90]

Constructions > Vertical line

When this button is pressed, clicking on the [graphics area](#)^[75] specifies a point through which a **vertical line** is passes.

The [status bar](#)^[142] displays the **distance** from the [origin of coordinates](#)^[118].

In the [3D window](#)^[169] at the place of the vertical line 2 horizontal lines will be displayed.

Default minimal and maximal heights of the lines are determined by the [line type](#)^[186], which constructs the vertical line. The heights can be set separately for each vertical line by means of the [current construction parameters panel](#)^[146], on which it is also possible to set coordinates of the vertical line in numeric values.

See also: ["Constructions" button group](#)^[90]

Constructions > Line segment

When this button is pressed, the first clicking on the [graphics area](#)^[75] specifies the start point of a **line segment**. Second clicking specifies the end point of the **line segment**.

The [status bar](#)^[142] displays the segments length and its projection to distance and height. Both clicks are to be made in the same projection. If the projections are different the measured values are incorrect, therefore when constructing a segment with its ends in different projections the values are not displayed in the **status bar**. In this case when changing a drawing the segment is attached to the projection with its **initial point**.

In the [3D window](#)^[169] a vertical rectangle will be displayed at the segment place.

Default minimal and maximal heights of the rectangle are determined by the [line type](#)^[186], which constructs the line segment. The heights can be set separately for each line segment by means of [current construction parameters panel](#)^[146], on which it is also possible to set coordinates of the line segment in numeric values.

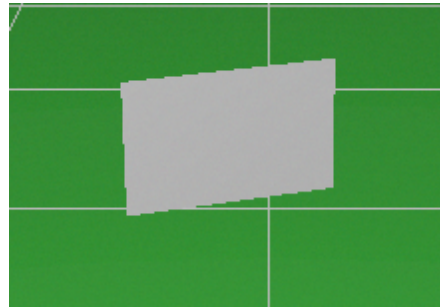
Color of the rectangle is determined only by [line type](#)^[186], which is used at constructing.

On the **current construction parameters panel** it is possible to set and fix **parameters of the segment**: coordinates of the first and second points, length, angle.

*A segment can be also used to **measure distances** on layouts without clicking for the second time in this case.*

*Line segments can be used for modeling cables with subsequent cable length calculation. Use separate **line types** to draw each cable type. For length calculation use the [Length calculation of line segments](#)^[208] tool.*

See also: ["Constructions" button group](#)^[90]



Constructions > Polyline

This tool allows to draw line segments continuously. The end of each segment is the start of the next one. To stop drawing lines, press **ESC**.

In other respects this tool equals to the [Line segment](#)^[92] (see. above).

See also: ["Constructions" button group](#)^[90]

Constructions > Angle

When this button is pressed, the first clicking on the [graphics area](#)^[75] specifies the **vertex** of an **angle**. Second and third clicking specify its **arms**.

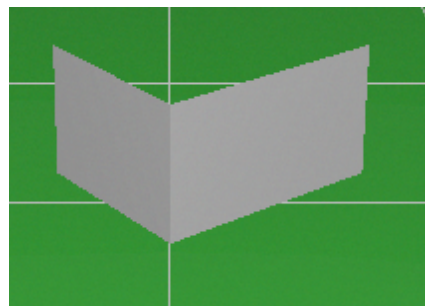
The [status bar](#)^[142] displays the angle value in **degrees**.

If the angle **vertex** and **arms** are constructed in **different projections**, when changing drawing the angle is attached to the projection with its vertex.

In the [3D window](#)^[169] 2 vertical rectangles will be displayed at the angle place.

Default minimal and maximal heights of the rectangles are determined by the [line type](#)^[186], which constructs the Angle. The heights can be set separately for each Angle by means of [current construction parameters panel](#)^[146], on which it is also possible to set coordinates of the line segment in numeric values.

Color of the rectangles is determined only by [line type](#)^[186], which is used at constructing.



On the **current construction parameters panel** it is possible to set and fix **parameters of the angle**: coordinates of the first, second, third points, length, angle value in degree.

The **angle** tool is also used to measure angles on layouts.

See also: "[Constructions](#)" [button group](#)^[90]

Constructions > Rectangle

When this button is pressed, the first clicking on the [graphics area](#)^[75] specifies the first corner of a rectangle. Second clicking completes the rectangle construction.

The [status bar](#)^[142] displays the information on the rectangle sizes and location.

In the [3D window](#)^[169] a parallelepiped will be displayed at the rectangle place.

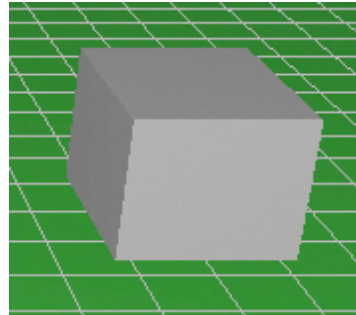
Default minimal and maximal heights of the parallelepiped are determined by the [line type](#)^[186], which constructs the rectangle. The heights can be set separately for each rectangle by means of [current construction parameters panel](#)^[146], on which it is also possible to set coordinates of the rectangle in numeric values.

Color of the parallelepiped is determined only by [line type](#)^[186], which is used at constructing.

On the **current construction parameters panel** it is possible to set and fix **parameters of the rectangle**: coordinates of the first points, height, width.

Rectangles are also used for creating rectangular **horizontal planes** in the **3D window**, for example a ceiling or floor.

See also: "[Constructions](#)" [button group](#)^[90]

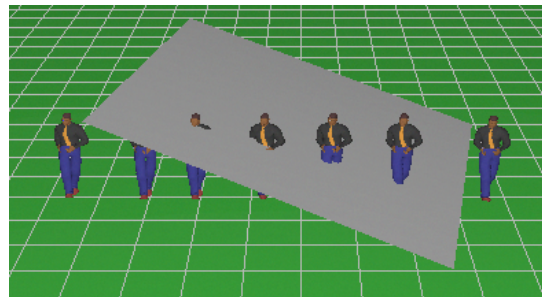


Constructions > Inclined rectangle

When this button is pressed, clicking on the [graphics area](#)^[75] specifies first corner of an inclined rectangle.

Inclined rectangle is similar to a [rectangle](#)^[93] and differs from it that in [3D window](#)^[169] it is displayed in the form of **inclined rectangle**. The **minimal height of rectangle** corresponds to the **lower side** of this rectangle, and the **maximal height** - to the **upper one**.

In the **Graphics window** the upper side of inclined rectangle is displayed by **thick line**.



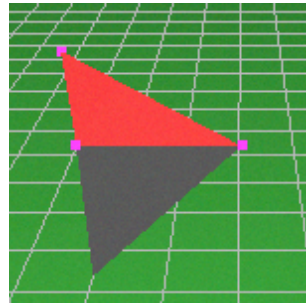
For modeling complex objects it is possible to [edit](#)^[87] inclined rectangle by points, moving its vertexes.

When moving separate vertexes press **Ctrl**.

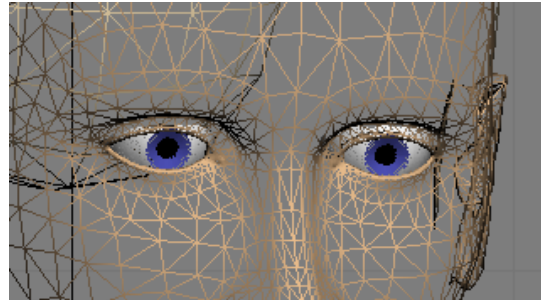
Inclined rectangle can be made transparent by 70 %. For this purpose it is necessary to mark the **Transparence** checkbox on the [Current construction parameter panel](#)^[146].

Inclined rectangle is very universal tool. Using the inclined rectangles it is possible to model any 3D objects.

It can be useful to combine inclined rectangles in pairs thus to get triangles with independent vertexes in the 3D space. Meanwhile two vertexes of each inclined rectangle must coincide. The rest two vertexes of first inclined rectangle must coincide with the other two vertexes of second inclined rectangle.



Using obtained triangles you can theoretically build any 3D surfaces, although it can be not simple in practice. For example, all 3D models in VideoCAD consist of triangular mesh only.



See also: ["Constructions" button group](#)^[90]

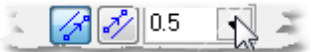
Constructions > Double line

When this button is pressed, the first clicking on the [graphics area](#)^[75] specifies the start point of a **double line**. Second clicking specifies the end point of the **double line**.

The **length** and the **width** of the double line appear in the [status bar](#)^[142].

In [line type panel](#)^[144] that appeared below **graphics area** there is a box in which it is possible to choose from the list or enter from keyboard the distance between lines of the double line.

Two buttons allow switching the **orientation of the second line** relatively to the first one

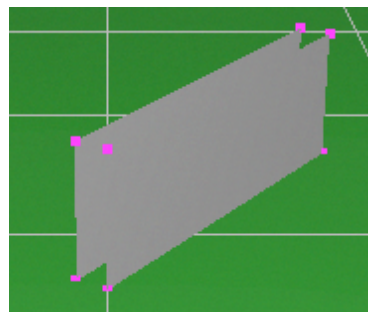


You can also switch the orientation quickly by pressing the **Space bar**.

In the [3D window](#)^[169] 2 vertical rectangles will be displayed at the double line place.

Default minimal and maximal heights of the rectangles are determined by the [line type](#)^[186], which constructs the double line. The heights can be set separately for each double line by means of [current construction parameters panel](#)^[146], on which it is also possible to set coordinates of the double line in numeric values.

Color of the rectangles is determined only by [line type](#)^[186], which is used at constructing.



On the **current construction parameters panel** it is possible to set and fix **parameters of the double line**: coordinates of the first, second points, length, angle.

See also: ["Constructions" button group](#)^[90]

Constructions > Wall

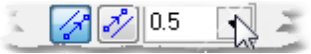
The Wall tool is intended for drawing walls with specified thickness and height. In these walls you can make [apertures](#)^[96] of any shape, for example for doors and windows.

When this button is pressed, the first clicking on the [graphics area](#)^[75] specifies the start point of a **Wall**. Second clicking specifies the end point of the **Wall**.

The **length** and the **width** of the wall appear in the [status bar](#)^[142].

In [line type panel](#)^[144] that appeared below **graphics area** there is a box in which it is possible to choose from the list or enter from keyboard the thickness of the wall.

Two buttons allow switching the **orientation** of the second wall side relatively to the first one



You can also switch the orientation quickly by pressing the **Space bar**.

In the [3D window](#)^[169] a parallelepiped will be displayed at the wall place.

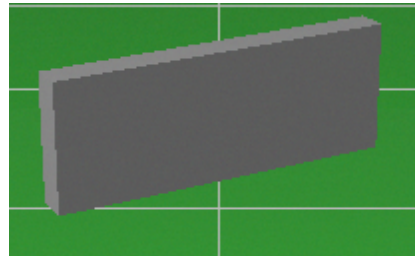
Default minimal and maximal heights of the wall are determined by the [line type](#)^[186], which constructs the wall. The heights can be set separately for each wall by means of the [current construction parameters panel](#)^[146], on which it is also possible to set coordinates of the wall in numeric values.

Color of the parallelepiped is determined only by [line type](#)^[186], which is used at constructing.

On the **current construction parameters panel** it is possible to set and fix **parameters of the wall**: coordinates of the first, second points, length, angle.

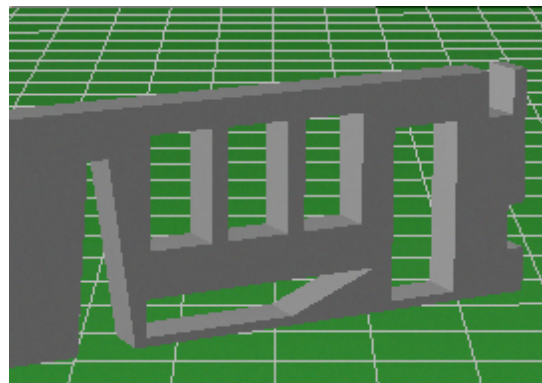
In walls it is possible to make apertures for doors and windows using the [Aperture in Wall](#)^[96] tool.

See also: ["Constructions" button group](#)^[90]

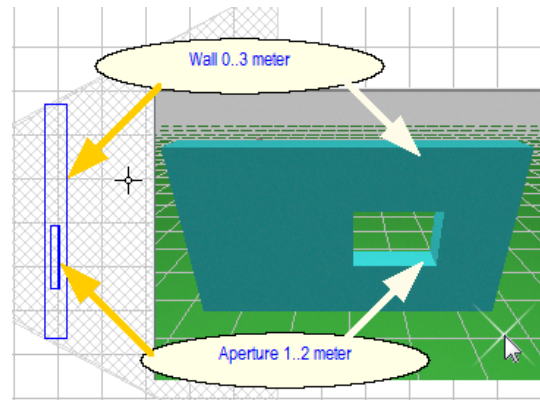


Constructions > Aperture in Wall

The Aperture in Wall tool designed to easily create apertures (openings) of various shapes in the walls, built by the [Wall](#)^[95] tool.



In order to an aperture will appear in the 3D space, it must intersect the horizontal projection of the wall.



The Aperture in Wall tool is similar to the [Inclined rectangle](#)^[94] tool. But the **Inclined rectangle** creates a **flat rectangle** in 3D space, but the **Aperture in Wall** placed inside the **Wall**, cuts an aperture in the wall. This aperture equals to the projection of the same **flat rectangle** on the plane of the wall.

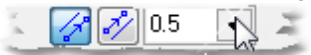
The **minimal height of aperture** corresponds to the **lower side** of this rectangle, and the **maximal height** - to the **upper one**.

In the **Graphics window** the upper side of aperture is displayed by **thick line**.

In [line type panel](#)^[144] that appeared below **graphics area** there is a box in which it is possible to choose from the list or enter from keyboard the thickness of the aperture.

The Thickness of the wall affects only the shape of aperture projection in the Graphics window. In the 3D window the apertures always cut through a wall at its full thickness.

Two buttons allow switching the **orientation** of the second aperture side relatively to the first one



You can also switch the orientation quickly by pressing the **Space bar**.

For modeling complex apertures it is possible to [edit](#)^[87] the Apertures by points, moving its vertexes.

*When moving separate vertexes press **Ctrl**.*

You can create complex apertures using several intersecting apertures.

See also: [Wall](#)^[95], ["Constructions" button group](#)^[90]

Constructions > Circle

When this button is pressed, the first clicking on the [graphics area](#)^[75] specifies the **center of a circle**. Second clicking completes the **circle** construction.

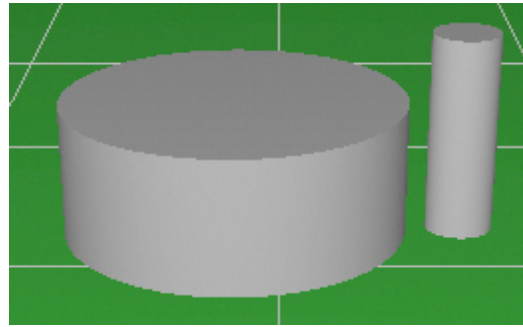
The [status bar](#)^[142] displays the information on the sizes and location of the circle.

To switch the **circle** into the **editing state** you need to double-click on **its center** or on the **point on its radius** that appears during the process of construction.

In the [3D window](#)^[169] a cylinder will be displayed in the circle place.

Default minimal and maximal heights of the cylinder are determined by the [line type](#)^[186], which constructs the circle. The heights can be set separately for each circle by means of [current construction parameters panel](#)^[146], on which it is also possible to set coordinates of the circle in numeric values.

Color of the cylinder is determined only by [line type](#)^[186], which is used at constructing.



On the **current construction parameters panel** it is possible to set and fix **parameters of the circle**: coordinates of the center and second point, radius, angle.

See also: ["Constructions" button group](#)^[90]

Constructions > Arc

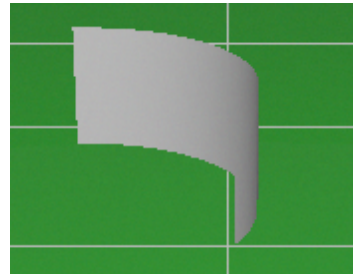
When this button is pressed, the first clicking on the [graphics area](#)^[75] specifies the **center** of an **arc**. Second and third clicking specify its **ends**.

To switch the arc into the **editing state** you need to double-click on **its center** or on either of its two ends.

In the [3D window](#)^[169] the arc stretches, creating a cylindrical surface.

Default minimal and maximal heights of the cylindrical surface are determined by the [line type](#)^[186], which constructs the arc. The heights can be set separately for each arc by means of [current construction parameters panel](#)^[146], on which it is also possible to set coordinates of the arc in numeric values.

Color of the arc is determined only by [line type](#)^[186], which is used at constructing.



On the **current construction parameters panel** it is possible to set and fix **parameters of the arc**: coordinates of the center, first and second points, radius, angle.

See also: ["Constructions" button group](#)^[90]

Constructions > Text

When this button is pressed, clicking on the [graphics area](#)^[75] specifies the place for a text string. At this point a **pop-up frame** with cursor will appear.

The necessary text is to be entered within a frame. To separate the lines use **Enter**.

The [font type panel](#)^[145] appears below in the graphics area allowing to change the [font type](#)^[188]. A **pop-up menu** is available within a frame, appearing at clicking the right mouse button.

The entered text is a text marker and can be quickly found using the [Find text](#)^[120] tool. This is a very convenient and quick means for navigation on big layouts.

See also: ["Constructions" button group](#)^[90], [Find text](#)^[120]

Constructions > Mask

When this button is pressed, the first clicking on the [graphics area](#)^[75] specifies the first vertex of **rectangular mask**. Second clicking completes the mask construction.

The [status bar](#)^[142] displays the information on the mask sizes and location.

Using **masks** allows to cover any image parts. [Constructions](#)^[90] and [texts](#)^[98] can be drawn over masks.

To cover **separate construction fragments** you can also use **line of white color**.
In the **3D window** masks are not shown.

See also: ["Constructions" button group](#)^[90]

Constructions > Filling

Filling is similar to a [mask](#)^[98], but can be of any color, and also in the form of **different hatch type**. Color of filling is defined by the **color of line type**, by which the filling is made, and **type of hatching** or its absence - by **style of this line type**.

Fillings, as well as other objects, could be [edited](#)^[87] by moving separate vertexes, and thus could be stretched on various objects.

In the **3D window** fillings are not shown.

See also: ["Constructions" button group](#)^[90]

Constructions > 3D model

The button opens submenu, in which there are **3D models** which are present in the program library.

When any item in the submenu is chosen, clicking in the [graphics area](#)^[75] specifies the place for a **3D model**.

***3D models** placement is possible in the horizontal and vertical projections, however only 3D models placed in **the horizontal projection** will be visible in the [3D window](#)^[169].*



In the horizontal projection the **3D models** are displayed in the **top view**, in the vertical projection - in the **side view**, and in the [3D window](#)^[169] models are as **3D objects**.

3D models can be **moved**, **rotated**, **copied**, changed [draw order](#)^[135] as other VideoCAD objects.

The default **height of the 3D models** above the ground is determined by the **maximal height of the line type**^[186] which was chosen when the **3D model** was being placed. The height can be set separately for each **3D model** using the [current construction parameters panel](#)^[146].

To change **3D model height** above the ground, [select](#)^[131] the 3D model, then [change line type](#)^[136] or switch the 3D model to editing state by double clicking on it and change value in the **3D H** box on the **Current construction parameters panel**.

By default the **3D models** are on the ground and constructed by the **line type** with the number, specified on the [Lines](#)^[186] tab of the [Options box](#)^[185]. This line type has the **maximum height equal to 0**.

*Heights can also take on **negative values**, in this case **3D model plunges under ground**.*

*For example, **to place a 3D model on a surface**: construct the surface by the [rectangle](#)^[93] tool using **line type** with the required maximum height, place the 3D model on it, and then change 3D model **line type** to the line type of the surface.*

On the **Current construction parameters panel** you can resize 3D models separately on axes. To do this, enter new values into X, Y, Z boxes during 3D model editing. If the  box is marked, change of any size leads to proportional change of other sizes, thus model proportions are not broken. 3D model **height above the ground** is displayed and can be changed in **3D H** box.

License plate of cars

Let's consider 3D models - cars with license plates. License plate type, the same for all car models, is determined by the file **number.bmp** file in the directory **\Models**, and the **plate size** - by the corresponding settings in the **Options box** on the [3D modeling](#)^[192] tab. This opportunity allows using the same models in different countries with different license plates.

To make cars appear in the 3D window with the license plate of your country:

- create a ***.bmp** file with the image of you license plate;
- !! *The size of file sides, in pixels, must be equal to powers of two:*
16,32,64,128,256,512,1024,2048
- replace the file **number.bmp** by your file;
- specify the sizes of your license plate in the **Options box**.

Adding new 3D models to the library

3D model files themselves are in the folder **\Models** in the VideoCAD installation directory. To add new 3D models to the program just copy the new model files into this directory.

You can import 3D models from Google SketchUp and Autodesk 3ds max. See: [Importing 3D models from Google SketchUp and Autodeck 3ds Max](#)^[255]

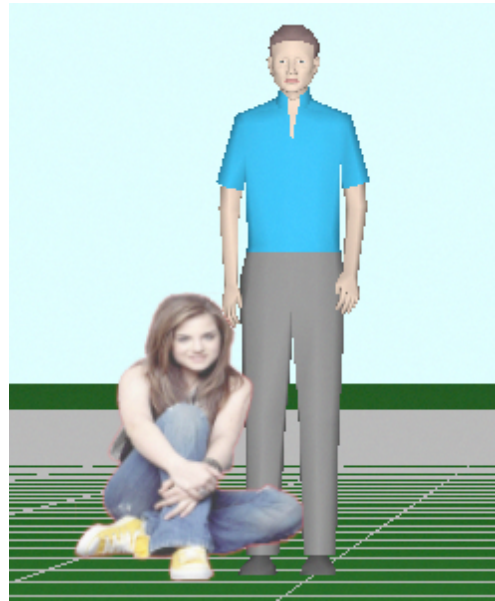
See also: [3D window](#)^[169], [Options box>Lines](#)^[186], [Options box>3D modeling](#)^[192].

Constructions > 3D image

This tool is similar to [Inclined rectangle](#)^[94]. As well as the **inclined rectangle** it allows to place a rectangle in three-dimensional space at any angle.

But this rectangle can be "covered" by any raster image in *.bmp or *.jpg formats. The image can be a photo or a figure. Pixels of the image can be transparent if they have a color **coincided** with the **color of the left bottom pixel**. Thus the image border can take any form.

In many cases raster images can replace [3D models](#)^[98] which are difficult to make. They can be used for modeling many objects from banknotes and plates up to a complex background.



After choosing this button the **Loading 3D image** dialog box appears. After choosing a file in *.bmp or *.jpg format place **3D image** in the same way as Inclined rectangle.

On the [Current construction parameter panel](#)^[146] the minimal height corresponds to the bottom bound of this rectangle and the maximal height - to the top bound.

In the **Graphics window** the top of 3D images is displayed by **thick line**.

Later **3D image** can be [edited](#)^[87] by moving its grips. It is possible to change **3D image** sizes on the Current construction parameter panel, delete and change the image file using buttons  and  on the **Current construction parameter panel**.

To make transparent pixels with color **coincided** with **color of left bottom pixel**, check **Transparence box** on the **Current construction parameter panel**.

*To get the transparence the image file has to be specially prepared by means of any graphic editor, for example **Paint**. **Pixels that should become transparent have to be filled by color that coincides with the color of left bottom pixel.***

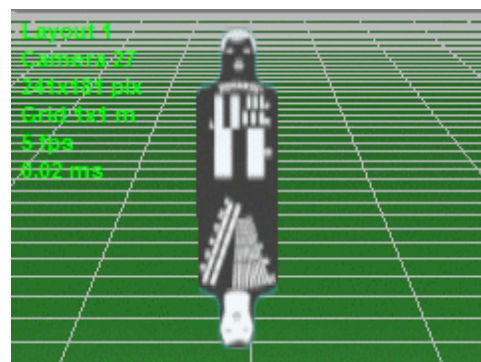
See also: ["Constructions" button group](#)^[90]

Constructions > Rotakin

Rotakin - an animated rotating test target for visual estimation of spatial resolution and motion distortions on the 3D images.

In the **horizontal plane** the Rotakin automatically turns towards the active camera.

In the **vertical plane** the Rotakin rotates with a specified speed about an axis passing through its center (in **Professional** version only).



To place the Rotakin specify a place for the Rotakin by clicking.

On the **current construction parameters panel** it is possible to set minimal and maximal

heights of the Rotakin.

*Rotating test target named **Rotakin** is used in field testing of video surveillance systems by the techniques developed by the **Home Office Scientific Development Branch 'Performance Testing of CCTV Perimeter Surveillance Systems (Using the Rotakin Standard Test Target)'**. The Rotakin model meets the requirements of the document.*

See also: ["Constructions" button group](#)^[90]

Constructions > Global snaps

Choosing this item opens a submenu enabling to switch global snaps on/off and display the snap panel, with the help of which it is convenient switch the snaps fast when drawing.

Snaps enhance the convenience in drawing. As a result of the snaps' functioning the cursor "sticks" to the certain **points**, **lines** or **directions**.

- **Points** - the cursor sticks to base object points.
- **Lines** - the cursor sticks to objects lines.
- **Angular** snap functions at construction of line segments, angles, cables, and at moving and rotating as well. After that the subsequent construction points are leveled from the previous points horizontally and vertically.
- **Extension** - the cursor sticks to the virtual horizontal and vertical lines passing through base objects points.

The snap Extension is disabled for [hidden](#)^[135] objects and in the [Select/Edit](#)^[87] mode.

- **At grid** - the cursor sticks to grid nodes.

*In the [Options box](#)^[198] you can change **snap sensitivity**.*

- **Show panel** - display the **snap panel**, with the help of which it is convenient switch the snaps fast while drawing.

The **pop-up menu** appearing when clicking the [graphics area](#)^[75] with the right button of the mouse contains an item **Local snap**. The **local snaps** have the same function as the global ones though working **during one operation**.

Constructions > Lock constructions

After modeling the environment the cameras' placement stage begins. At this stage displacement of constructions is not required any more, and their casual selection can cause inconveniences. If this item is marked, the selection of constructions is locked. To release the locking, click this item once again.

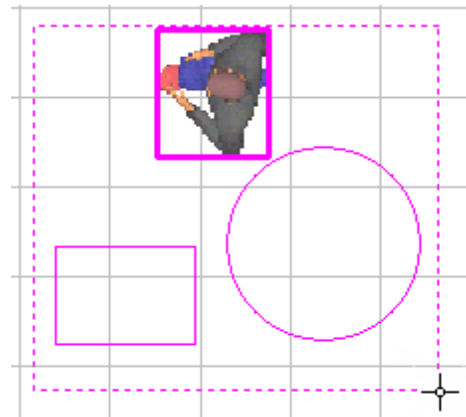
Edit > Select All

Select all constructions, models, cameras, cables and illuminators on the current layout.

Edit > Select/Edit

With this button chosen the first corner of **selection window** appears when clicking any empty place of **graphics area**^[75] once. Clicking it again completes the designation of **selection window**.

All the **objects**, which hit in the **selection window** and reside on the **projection** coinciding with one being clicked for the first time, will be **selected**^[77]. However, the earlier **selected objects** not hitting in the **selection window** will revert to **normal state**^[76].



If **Ctrl** is pressed at clicking, the **objects** within the **selection window** are inverted, on the contrary, state of those not hitting in the **selection window** remains the same.

It is possible to **select objects by one** by clicking their image once, thus enabling the earlier selected **objects** to revert to normal state.

If **Ctrl** is pressed at clicking, the **objects** are inverted, and the state of the rest remains the same.

During construction **3D scenes**^[169] it is often necessary to place some constructions one over another at a different height, made by means of different **line types**^[186].

To **select one or more construction, located one over another**, made by means of different line types:

- make the **line type panel**^[144] visible, for example by double clicking any construction;
 - choose on the panel the line type of construction you want to select;
- select the construction by clicking.

Just repeat clicking at the same place without moving the cursor. Thus objects under the cursor will be selected sequentially.

To move objects on the foreground or background use menu items: **Bring to front**^[135], **Send to back**^[135].

Selected objects can be moved. To move the selected objects, bring the cursor to the selected one, press the left mouse button and move the selected objects. After finishing the moving, release left mouse button.

To cancel selection click this button again.

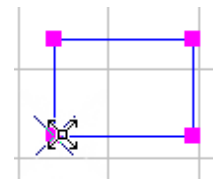
To **select all objects** on the current layout use **Ctrl+A** shortcut.

For switching to Select / Edit mode from any mode use also **Esc** button.

See also: **Selected state**^[77]

Editing state of objects

To translate an object into **editing state**^[77] double-click its image. After that **pink grips** appear on the object base points. When moving the cursor over this point its image changes.



To edit an object click beside a base point with a grip and move the cursor. After clicking for the second time, the changed object is set up.

To switch the [circle](#)^[126] into the editing state you need to double-click on its center or on the point on its radius that appears during the process of construction.

To switch the [arc](#)^[127] into the editing state you need to double-click on its center or on either of its two ends.

When editing a [rectangle](#)^[93] or a [mask](#)^[98], then several points will move at a time, the rectangle or the mask remaining square.

If **Ctrl** is pressed when editing a rectangle or a mask, then one point will move only.

When editing a [Double line](#)^[94] or [Wall](#)^[95], the whole Double line or Wall will be moved.

If **Ctrl** is pressed when editing the double line or wall, only one line will be moved.

When clicking the [text](#)^[98] twice the pop-up frame appears allowing to edit text in it. When clicking the right mouse button the pop-up menu of text editing appears in the frame.

It is possible to change object's parameters in editing state on the [current construction parameters panel](#)^[146] which automatically appears in the bottom of graphics window.

See also: [Editing state](#)^[77]



Activate cameras

When double-clicking the camera lens the following actions are performed:

- the [Active camera](#)^[78] is saved.
- the camera being double-clicked will become active.

It is convenient to pan and tilt the active camera by moving the grip in the middle of the view area upper bound.

In a similar way by moving grips on the ends of the view area upper bound it is possible to change [lens focal length](#)^[153] of the camera.

See also: [Active camera](#)^[78]

See also: ["Edit" button group](#)^[87]

Edit > Cut

Cut the [selected objects](#)^[77] into the VideoCAD internal clipboard.

It is possible to cut **objects** of different projections at a time, and to cut any quantity of [constructions](#)^[90], [3D objects](#)^[128], **cameras**

Edit > Copy

Copy the [selected objects](#)^[77] into the VideoCAD internal clipboard.

It is possible to copy **objects** of different projections at a time, and to copy any quantity of [constructions](#)^[90], [3D objects](#)^[128], [texts](#)^[98] and **cables**.

See also: [Copy with base point](#)^[134]

Edit > Cut with base point

Cut the [selected objects](#)^[77] into the VideoCAD internal clipboard relative to a base point. After clicking this button specify the **base point** of cutting.

It is possible to cut **objects** of different projections at a time, and to cut any quantity of [constructions](#)^[90], [3D objects](#)^[128], [texts](#)^[98], **cameras** and **cables** as well.

When cutting the active camera it is copied.

See also: [Cut](#)^[133].

Edit > Copy with base point

Copy the [selected objects](#)^[77] into the VideoCAD internal clipboard relative to a base point. After clicking this button specify the **base point** of copying.

It is possible to copy **objects** of different projections at a time, and to copy any quantity of [constructions](#)^[90], [3D objects](#)^[128], [texts](#)^[98], **cameras** and **cables** as well.

See also: [Copy](#)^[133].

Edit > Paste

Paste the **objects** from the VideoCAD internal clipboard.

After clicking this button specify the **base point** of paste in the projection being clicked when **cutting** or **copying**.

It is possible to paste into different [layouts](#)^[204], paste **cables** of one camera while another camera is active (in this case the pasted cables belong to a camera which is active during paste), and to paste any quantity of [constructions](#)^[90], [3D objects](#)^[128], **cameras**, [texts](#)^[98] and **cables** at a time.

It is available to **copy** and **paste constructions, cables and texts between the projects**. To this effect make a copy in one project, then open another project or create a new one and paste what you have copied.

Be careful when copying and pasting **cables**. You can copy only **cables of Active camera**^[78], and when pasting, these cables will belong to the **camera which is active during pasting**.

*If a camera is being pasted a **new camera** with parameters of the pasted camera is created automatically. **This is an alternative way to create new cameras.***

Edit > Move

Move the [selected objects](#)^[77].

After clicking this button the first click in a [graphics area](#)^[75] designates the starting moving point, the second click - the final one.

*When moving take into account the **projection** to which the objects are attached. A simultaneous moving objects in different projections vertically is locked as being incorrect.*

[Selected](#)^[77] objects or cameras can be moved in [Select / edit](#)^[87] mode. In order to move place the cursor above the selected object, press left mouse button, move, after moving is finished release the left mouse button.

Edit > Rotate

Rotate the [selected objects](#)^[77].

After clicking this button the first click in a [graphics area](#)^[75] designates the rotation **center**, the second click specifies the initial rotating point, and the third click specifies the final rotating point.

*When rotating take into account the **projection** to which the objects are attached. The selected objects, attached to the projection with a rotation center designated, can rotate only.*

The [scalable](#)^[188] fonts can rotate only. If a font is not scalable then its **initial point** rotates only, **the text remaining horizontal**.

The active camera can be rotated in [Select / edit](#)^[87] mode by moving the grip in the middle of the view area upper bound.

Edit > Scale

Change scale of [selected](#)^[77] constructions relative to the center of scaling.

After clicking on this button, the first click on the [graphics area](#)^[75] specifies the **center of scaling**.

Then moving the cursor up increases sizes of selected constructions, moving the cursor down decreases sizes of selected constructions.

In the [Status bar](#)^[142] the current scale factor is displayed.

When required sizes will be achieved, click for the second time to complete scaling operation. To cancel the scaling press **ESC**.

This tool does not scale [3D models](#)^[98]. 3D models can be scaled in [editing state](#)^[77] with the help of the [Current construction parameter panel](#)^[147].

Edit > Mirror

Mirror the [selected](#)^[77] constructions relative to the horizontal or vertical line passing through the specified point.

After clicking on this button, the first click on the [graphics area](#)^[75] specifies the point through which a mirror line must be passed.

Then moving the cursor changes position of the mirror line.

When required position of the mirroring objects will be achieved, click for the second time to complete mirroring operation. To cancel mirroring press **ESC**.

Edit > Bring to Front

Move [selected objects](#)^[77] on the foreground, then other objects will not shadow them.

To move cameras over constructions use the [Cameras over constructions](#)^[117] item.

Changing the objects' draw order can be required at operation with large [3D models](#)^[128] of rooms, and also at operation with constructions placed one over another.

Edit > Send to Back

Move selected objects on the background, then selected objects will be covered by other objects.

To move cameras over constructions use the [Cameras over constructions](#)^[117] item.

Changing the objects' draw order can be required at operation with large [3D models](#)^[128] of rooms, and also at operation with constructions placed one over another.

Edit > Hide

Hide the [selected objects](#)^[77].

With this item chosen the **selected objects** proceed into [hidden state](#)^[79]. In the **hidden state** the objects are displayed on the background in **light grey** color. The rest characteristics are similar to

those of [normal state](#)^[76].

The **hidden state** is used to conceal the temporarily interfering objects.

To return to **normal state** [select](#)^[131] the **hidden objects**.

The snap [Extension](#)^[131] is disabled for **hidden objects**.

When working with a separate **object** it is convenient to **select all** the objects in [layout](#)^[112] using the shortcut **Ctrl+A** and **hide** them. After that **select** the objects needed.

Edit > Align

Align the [selected objects](#)^[77].

Because limited accuracy of computer calculations, sometimes after a rotation objects' form is being distorted a little.

The effect of choosing this item is alignment of the form of selected objects.

Efficiency of alignment depends on a scale. Vast scale provides the minimum of efficiency, small scale - the maximum. At high degree of efficiency small objects can be distorted.

Edit > Change Line type

After choosing this item at the bottom of the [graphics area](#)^[75] appears the [line type panel](#)^[144]. In the **line type panel** you can choose [line type](#)^[186] for the [selected](#)^[77] [constructions](#)^[90] **and cameras**.

Line type changing by this tool does not change minimal and maximal [heights](#)^[146] of already constructed objects. For changing line type with returning heights to values set in the new line type [parameters](#)^[186], use the [Line type panel](#)^[144] in [editing state](#)^[77] of one construction.

Edit > Combine to block

Combine to a block all [selected](#)^[77] [constructions](#)^[90]. The block will behave as one object. Combining is convenient at modeling complex objects and their subsequent moving, rotating and copying.

Edit > Destroy block

Divide selected blocks to separate objects.

Edit > Undo

Undo the last operation.

VideoCAD stores several **last operations including Undo operation**. When clicking this button successively VideoCAD retraces to the last states and a state before the button **Undo** was clicked for the first time.

The quantity of the stored operations can be adjusted in the Options box>Miscellaneous>[UNDO depth](#)^[198].

Edit > Redo

Redo the last operation undone by the [UNDO](#)^[104] tool.

Edit > Erase

Erase the [selected objects](#)^[77].

If there are no **selected objects** this item is disabled.

Use also **Del**.

You can not erase the active camera.

Edit > Erase all

Erase all [constructions](#)^[90].

If there are no **constructions** this item is disabled.

Cables > Signal cable

When this button pressed, you can draw the **signal cable** of the **active camera** by successive clicks in the **graphics area**. The end of each segment is the start of the next one. To stop drawing cable, press **ESC**.

The [status bar](#)^[142] displays the segment length and its projection to distance and height.

Both clicks are to be made in the **same projection**. If the projections are different the measured values are incorrect, therefore when constructing a segment with its ends in different projections the values are not displayed in the **status bar**. In this case when changing the drawing the segment is attached to the projection with its **initial point**.

A cable consists of **segments**, allowing to draw it in different projections and layouts, representing an actual scheme of laying accurately.

When [copying](#)^[89] the **cable segments** between **cameras** and [layouts](#)^[204] a process of cable drawing is accelerated considerably even in complex CCTV systems.

When drawing a cable the menu item [Cable laying](#)^[138] might be used. When choosing it a float panel of the same name appears enabling to choose a shift of segment ends for a level parallel cable drawing along the walls, columns etc.

The type and parameters of **line designating the Signal cable** can be changed in the [options box](#)^[186].

VideoCAD summarizes the lengths of all the segments, considers the **reserves** and calculates the **total length of cable**. To change the default parameters and obtain the calculation results double-click the image of any cable segment or click **Signal cable** again.

A dialog box of the same name appears after that.

*You can open this box by choosing **Calculate** item near **Signal cable** item.*

The results of the cables' calculation on each individual camera and on the project as a whole are included into the text file obtained by [Export to text](#)^[107] and [Cable report](#)^[139].

It is possible to use [Line segments](#)^[92] for cable modeling with subsequent cable length calculation. Use separate [line types](#)^[186] for drawing a cable of each type. For length calculation use the [Length calculation of line segments](#)^[208] tool and the [Cable report](#)^[139].

See also: ["Constructions" button group](#)^[90], [View>Active camera cables](#)^[117], [View>All camera cables](#)^[117], [Cable laying](#)^[138], [Length calculation of line segments](#)^[208], [Cable report](#)^[139].

Cables > Power cable

When this button pressed, you can draw the **power cable** of the **active camera** by successive clicks in the **graphics area**. The end of each segment is the start of the next one. To stop drawing cable, press **ESC**.

The [status bar](#)^[142] displays the segment length and its projection to distance and height.

Both clicks are to be made in the **same projection**. If the projections are different the measured values are incorrect, therefore when constructing a segment with its ends in different projections the values are not displayed in the **status bar**. In this case when changing a drawing the segment is attached to the projection with its **initial point**.

A cable consists of **segments**, allowing to draw it in different projections and layouts, representing an actual scheme of laying accurately.

When [copying](#)^[89] the **cable segments** between **cameras** and [layouts](#)^[204] a process of cable drawing is accelerated considerably even in complex CCTV systems.

When drawing a cable the menu item [Cable laying](#)^[138] might be used. When choosing it a float panel of the same name appears enabling to choose a shift of segment ends for a level parallel cable drawing along the walls, columns etc.

The type and parameters of **line designating the power cable** can be changed in the [options box](#)^[186].

VideoCAD summarizes the lengths of all the segments, considers the **reserves** and calculates the **total length of cable**. To change the default parameters and obtain the calculation results double-click the image of any cable segment or click **Power cable** again.

A dialog box of the same name appears after that enabling to choose a **cross-section area of power cable** to fit the requirements of **camera voltage supply**. It is assumed that the conductor material is **copper** and the conductor temperature is **+ 50° C**.

You can open this box by choosing **Calculate** item near **Power cable** item.

The results of the cables' calculation on each individual camera, each individual section area and on the project as a whole are included into the text file obtained by [Export to Text](#)^[107] and [Cable report](#)^[139].

It is possible to use [Line segments](#)^[92] for cable modeling with subsequent cable length calculation. Use separate [line types](#)^[186] for drawing a cable of each type. For length calculation use the [Length calculation of line segments](#)^[208] tool, [Cable report](#)^[139].

See also: ["Constructions" button group](#)^[90], [View>Active camera cables](#)^[117], [View>All camera cables](#)^[117], [Cable laying](#)^[138], [Length calculation of line segments](#)^[208], [Cable report](#)^[139].

Cables > Cable laying

With this item chosen a **float panel** of the same name appears enabling to choose a shift of segment ends for a level parallel cable drawing along the walls, columns etc.

See also: [View>Active camera cables](#)^[117], [View>All camera cables](#)^[117]

Cables > Length calculation of line segments

Clicking this item will open a box allowing calculate total length of any [line segments](#)^[121]. This tool allows using line segments for modeling cables.

See more: [Length calculation of line segments](#)^[208], See also: [Cables](#)^[137]

Cables > Cable report

Choosing this item opens a box with a text report of all [line segments](#)^[92] and [cables](#)^[101] made by **line types** with marked [Cable](#)^[186] box in the parameters of the line type.

These **line types** are considered as **cable brands**. These line types can be assigned to the [Signal cable](#)^[205] and the [Power cable](#)^[206] of any camera.

You can simply draw cables as **line segments** on layouts using these line types. In this case, the cables are considered as **main cables** which are not attached to any camera.

The Cable report includes the cables attached to cameras and the **main cables** as well. Cable lengths is calculated for each brand (line type) separately.

See also: [Length calculation of line segments](#)^[208], [Calculation lenght of cables and getting the Cable report](#)^[246], [Signal cable length calculation box](#)^[205], [Power cable electrical parameters and length calculation box](#)^[206].

Help > About VideoCAD

Open the About box with the general information of VideoCAD version and the Authors.

Help > Help contents

Open the contents of this Help file.

Help > Language

Choose the language.

All the text resources of the program are stored in ***.Ing** files in the VideoCAD installation directory. We are interested in translating the program to other languages.

If you can do it, could you please contact us. support@cctvcad.com

We offer big discounts for the translations.

How to add a new interface language

There is English.Ing file in a directory of VideoCAD (or VideoCADdemo) installation. All text elements of the interface are loaded from this file.

For creation of new interface language it is necessary:

1. Copy English.Ing (Russian.Ing) file under a new name <YourLanguage>.Ing
2. Accurately translate each line in the file. Don't change positions of the lines, don't delete or create new lines! Each position corresponds to some interface element. Don't translate lines which begin from '///' - they are labels. It is necessary to keep all blanks between lines.
3. Copy the obtained new file to the directory of VideoCAD(VideoCADdemo) installation and start VideoCAD (or VideoCADdemo).
4. Choose Main menu> Help> Language><YourLanguage>
5. Check up new interface. Correct the <YourLanguage>.Ing file if necessary.

Don't hesitate to contact us in case of any troubles.

Help > Home page

Visit CCTVCAD Software home page in the Internet.

Help > Order

Visit CCTVCAD Software Order page in the Internet.

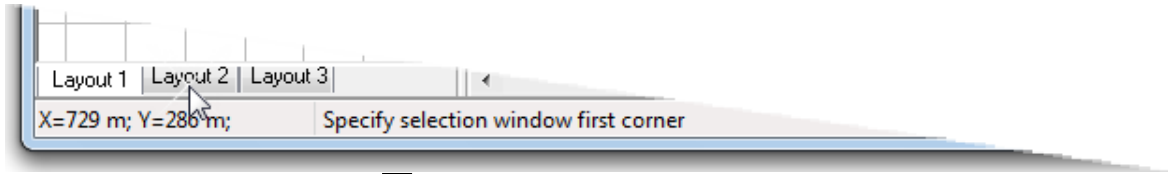
Help > User forum

Visit CCTVCAD Software User forum in the Internet.

Help > Contact us

Send us an email message.

7.1.4 Layout tabs



See [location of the Layouts tabs](#)^[74]

There are **Layouts tabs** in the bottom-left corner of the [Graphics area](#)^[75]. Each tab corresponds to the separate layout created in the project.

The layouts are separate sections of monitored object (building, room, territory and storey). A layout contains the horizontal and vertical projections locating backgrounds, **cameras**, [cables](#)^[137] and [constructions](#)^[90]. Each camera can be displayed in one **layout** only, but camera **cables** may pass through several layouts.

The project may contain up to **10** layouts. Originally one layout is created into project.

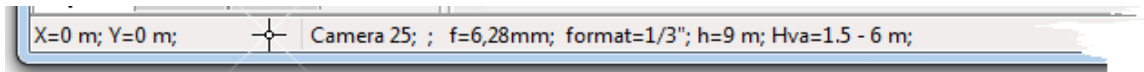
To show any layout, click the tab with its name.

Using the pop-up menu, which appears by right clicking on the tab, you can create, delete, and rename layouts or show the current layout completely.

The **original layout** and any layout with the cameras present in it can not be deleted.

See also: [Layouts box](#)^[204]

7.1.5 Status bar



See: [location of the Status bar](#)^[74]

[Graphics window](#)^[74] **status bar** is situated in the bottom of the **graphics window** and consists of two parts.

The left part is constantly displaying the **current coordinate of the cursor** relatively to the [origin of coordinates](#)^[118].

If the **origin** coinciding with the active camera is set up, then the coordinates have the following values:

- If the cursor is in the **vertical projection**, then it is the **distance to the camera location** and its **height above the ground**. If the cursor is in the **horizontal projection**, then it is the **distance to the active camera location** in horizontal and vertical.

If there is no **active camera** in the layout displayed, then the values of coordinates have no sense.

- The right part is displaying the **measurement results** and the **hints**.

*The **construction coordinates** are displayed relatively to the chosen [origin of coordinates](#)^[118]. The coordinates of constructions **belonging to one camera only** ([change view area upper bound](#)^[103]) are always displayed **relatively to the active camera**.*

At moving the cursor nearer to the camera icon the name, model name and basic camera parameters are displayed.

During [scaling](#)^[90], in the right part of the Status bar the **current scale factor** is displayed.

7.1.6 Pop-up panels

See [location of the Pop-up panels](#)  ⁷⁴

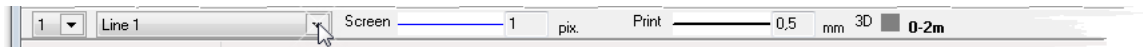
Pop-up panels appear automatically in the bottom of the Graphics window during creating or editing constructions and texts.

[Line type panel](#)  ¹⁴⁴

[Font type panel](#)  ¹⁴⁵

[Current construction parameter panel](#)  ¹⁴⁶

7.1.6.1 Line type panel



The panel is designed for choosing [line types](#)^[186] and displaying parameters of the **current line type**.

The panel appears automatically in the bottom of the [graphics area](#)^[75] when clicking the [construction buttons](#)^[90], when choosing the correspondent **menu items** or when [editing](#)^[87] constructions.

The panel hides automatically in other modes. You can hide the panel by choosing the **Hide panel** item in the **pop-up menu** appearing when right clicking the panel.

The panel contains the following items:

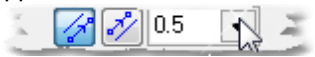
- Line type number box
- Line type name box

Choosing values in these boxes changes the **current line type**.

*As a result of changing **line type** of a construction using this tool, the minimum and maximum [heights](#)^[146] will be returned to values set in [parameters](#)^[186] of the new line type.*

For changing a line type without changing heights, use [Change line type](#)^[136] tool.

When drawing a [Double line](#)^[124], [Wall](#)^[95] or [Aperture in Wall](#)^[96], in the right part of **line type panel** appear additional elements:



- Box in which it is possible to choose or enter from the keyboard the **width of the double line (wall or aperture)**.
- Two buttons  allow switching the **orientation of the second line** relatively to the first one. *You can also switch the orientation quickly with the help of the **Space bar**.*

Other items display parameters of the **chosen line type**. The parameters can be changed in the [options box](#)^[186] launched by double-clicking the **line type panel** or by choosing the item **Edit line type** in the **pop-up menu** which appears when right clicking the panel.

7.1.6.2 Font type panel



The panel is designed for choosing **font types** and displaying parameters of the **current font type**. The panel appears automatically in the bottom of the [graphics area](#)^[75] when clicking the button [Text](#)^[98], when choosing the correspondent **menu items** or when [editing](#)^[87] **text**.

The panel hides automatically in other modes. You can hide the panel by choosing the item **Hide panel** in the **pop-up menu** appearing when right clicking the panel.

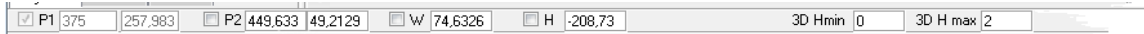
The panel contains the following items:

- Font type number box
- Font type name box

Choosing values in these boxes changes the **current font type**.

Other items display parameters of the **chosen font type**. The parameters can be changed in the [options box](#)^[188] launched by double-clicking the **font type panel** or by choosing the **Edit font type** item in the **pop-up menu** which appears when right clicking the panel.

7.1.6.3 Current construction parameter panel



The Panel is intended to set and edit **parameters of constructions, 3D models**. The Panel appears automatically at the bottom of the [Graphics area](#)^[74] when drawing or editing constructions. The set of the parameters for each kind of construction (point, line, rectangle, etc.) differs.

For example:

- for a point it is coordinates of the point, and its heights in the 3D window;
- for a line segment it is coordinates of the segment's ends, length, angle and its heights in the 3D window;
- for a rectangle it is coordinates of corners, height, width and its heights in the 3D window, etc.

Options of the panel in **Construction** and [Editing](#)^[77] modes differ.

In the Construction mode:

It is possible to draw constructions, having set the parameters sufficient for complete definition of this construction.

For example, for a line segment it is enough to set coordinates of the first and second point, or coordinates of the first point, an angle and length.

It is possible to fix some parameters of construction, having marked check boxes nearby these parameters **L** . At moving the cursor, the construction will be drawn in such a manner that the fixed parameter will remain constant.

For example, for a line segment it is possible to fix length or angle, for a rectangle - width or height, etc.

After a construction has been drawn, in the right end of the panel Edit button appears. Clicking this button allows editing just created construction.

In the Editing mode:

It is possible to edit any parameters of construction from keyboard, thus the result of changing will be visible at once.

In both modes it is possible to change the **minimal and maximal heights** of the construction in the 3D window irrespective of parameters of [line type](#)^[186], by which the construction is drawn.

3D model, 3D image, Inclined rectangle, transparency

During placing or editing [3D models](#)^[98], special parameter set on the Current construction parameter panel is displayed.

See details: [3D models](#)^[147].

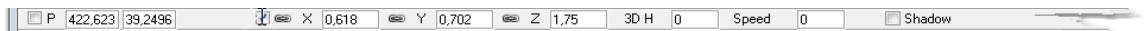
During drawing or editing [3D images](#)^[100] using the **Current construction parameter panel** it is possible:

- Load raster image by **Load image** button;
- Delete image by **Delete image** button;
- Mark **Transparency** box to make pixels transparent, which color coincides with the color of the left-bottom pixel.

During [Inclined rectangle](#)^[94] drawing or editing it is possible to make it transparent by 70 %. To do this mark **Transparence** box.

*Transparence of **3D images** and transparence of **Inclined rectangle** have different purport. Inclined rectangle becomes completely transparent by 70 %, what makes possible modeling glass. On **3D image** pixels become completely transparent, which color coincides with color of the left-bottom pixel. Other pixels remain opaque. Thus, you can model objects of irregular shape using **3D images**.*

7.1.6.3.1 3D models



Current construction parameter panel 3D models

You can resize 3D models separately on axes.

To do this, enter new values into **X**, **Y**, **Z** boxes during 3D model editing. If the  box is marked, change of any size leads to proportional change of other sizes, thus model proportions are not broken.

3D model **height above the ground** is displayed and can be changed in the **3D H** box.

7.1.7 Keyboard shortcuts

Keyboard shortcuts allow fast activation of various commands, by pressing shortcuts on the keyboard.

VideoCAD has:

- [Predefined shortcuts](#)^[148] which cannot be changed;
- [Customizable shortcuts](#)^[148] which can be adjusted according to users' preferences.

Predefined shortcuts

F1 Call Help information of interface element, box or window, which has the input focus.

Ctrl+A Select all [objects](#)^[76] in the current [layout](#)^[204].

Ctrl+TAB Switch to the next **layout** in turn.

Ctrl+Space bar Save the *active camera* and activate the next camera in turn in the current *layout*. If there is no active camera in the current **layout**, then a camera with the minimal number will be activated.

ESC Stop the current operation, if an operation is executed. If no operation is executed, switching to the [Select/Edit](#)^[87] mode.

DEL Delete [selected](#)^[87] objects.

Spacebar Pressing **Spacebar** when constructing a [double line](#)^[94], [wall](#)^[95], [aperture in wall](#)^[96] enables to switch the **orientation of the second line (side)** relatively to the first one quickly.

+ (plus on the digital keypad) Zoom in, if the input focus is on the [Graphics area](#)^[75].

- (minus on the digital keypad) Zoom out if the input focus is on the **Graphics area**.

When **Alt** is pressed, it is possible to move drawing in the Graphics window using **arrow keys** and change scale using **+ plus and - minus** keys irrespective of the input focus.

Ctrl has several purposes:

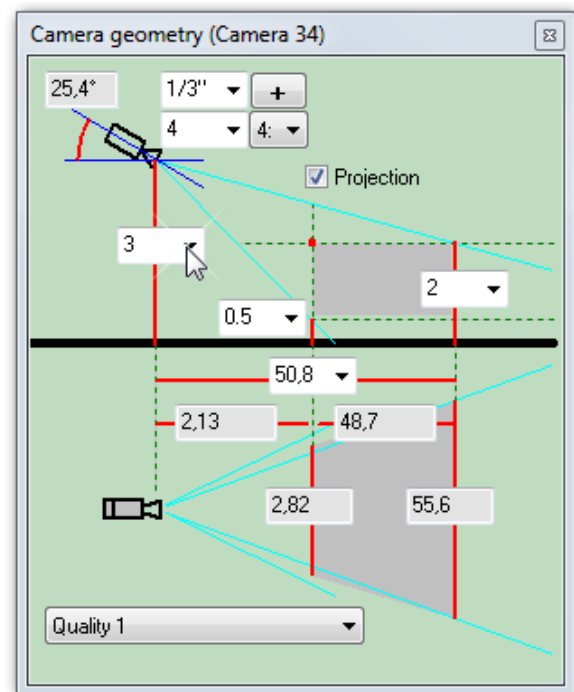
- Changes the [selection logic](#)^[87]
- Allows moving the **horizontal projection** vertically apart from the vertical one using the **middle mouse button** or the button [Move drawing](#)^[103].
- If **Ctrl** is not pressed, then the **whole drawing moves**, if **Ctrl** is pressed, the **horizontal projection moves only**.
- If **Ctrl** is pressed and held down when editing [rectangle](#)^[93], [mask](#)^[98], [inclined rectangle](#)^[94], [filling](#)^[98] or [3D image](#)^[100] by moving pink grips, then one point move only. If **Ctrl** is not pressed when editing these objects, then several points will move at a time, the editing object remain square.
- If **Ctrl** is pressed when editing a [double line](#)^[94], [wall](#)^[95], [aperture in wall](#)^[96] then **only one line** will be moved. If **Ctrl** was not pressed when editing these objects, the **whole double line (wall, aperture)** will be moved.
- If **Ctrl is not pressed** at changing the common **scale**, then the scale changes roughly which is convenient at navigation. If **Ctrl is pressed**, the scale changes with the less step which is convenient for the precise drawing positioning before printing or saving.

Customizable shortcuts

Customizable shortcuts are seen in the [Main menu](#)^[105] of the **Graphics window** during the program operation. These shortcuts can be changed on the [Keyboard](#)^[190] tab in the **Options box**. Shortcuts can be assigned to any item of the **Main menu** of the **Graphics window**.

7.2 Camera Geometry

Camera Geometry box includes geometric parameters of [active camera](#)^[78], lens and installation parameters of the camera.



- In the **Camera Geometry box**, geometric parameters of the active camera view area in the horizontal and vertical planes is displayed.
- The image in the **Camera Geometry box** is representing the two projections of view area, parted by the horizontal black line correspondent to the ground in the vertical (upper) projection.
- The red lines mark the **sizes**, the green dash lines specify **auxiliary constructions**, the dark blue lines designate the camera tilt angle, and the turquoise ones mark the space bounds of camera view area.

The **actual projection** of view area as a result of calculations is filled by grey color.

- The camera location and **calculated** parameters are displayed in the **text boxes** next to the camera icon and the red dimension lines. The parameters in the white boxes can be changed, by choosing them from list or by typing. When any of the parameters is changed, the values of the rest parameters are recalculated.

*You can change any parameters **of all selected cameras simultaneously**. For this purpose:*

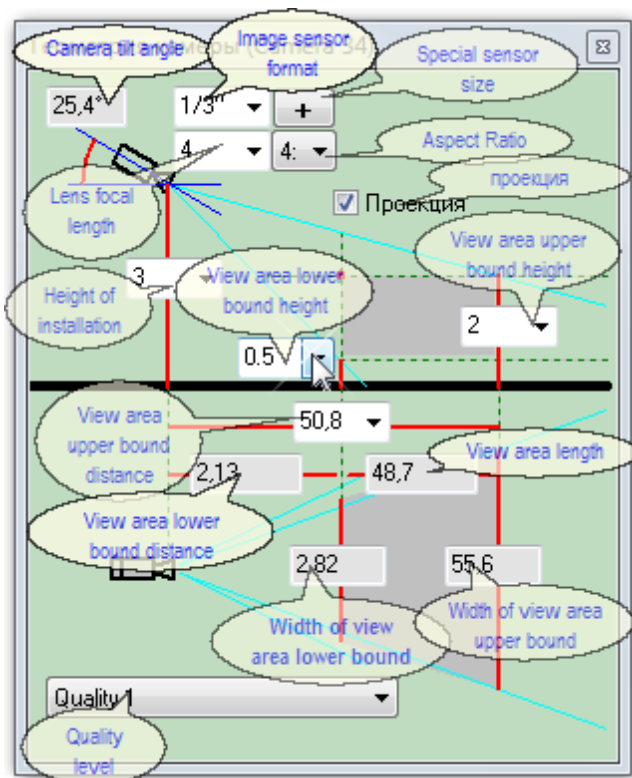
- [Select](#)^[87] necessary cameras on the layout
- Right click on the combo box, then click on the **Assign to selected cameras pop up** item.
- The parameters in the **grey** text boxes are results of calculation and can be changed only through changing the parameters in the white boxes.
- The linear parameters are input and output in **meters** or feet according to the [measurement system](#)^[107] set in the project, if not specified otherwise on the image. The angular parameters are input and output in **degrees**.
- When an **incorrect value** is entered the box turns **red**. When an incorrect value ratio is ensued from the input, all boxes with the values of mutually incorrect ratio turn red. If the calculation with incorrect values is still possible and has sense, the program nevertheless performs it. In this case check the results carefully. You can see the source of mistake in the [graphics window](#)^[74].

- If the image of view area **changes radically** with new values, the image in the **Camera Geometry box** changes correspondingly, thus the arrangement of parameter boxes are changed too. Watch carefully the image changed, since with the image alteration the parameter boxes might interchange their positions.

See also: [Parameters in the Camera Geometry box](#)^[153]

External link: ["The principles of CCTV design in VideoCAD. Part I. Camera view area"\(*.pdf\)](#).

7.2.1 Parameter list



Camera parameters

[Image sensor format](#)^[153]

[Lens focal length](#)^[153]

[Aspect Ratio](#)^[154]

[Special sensor size](#)^[154]

Camera installation parameters

[Height of installation](#)^[154]

[Camera tilt angle](#)^[154]

View area limitations

[View area upper bound height](#)^[155]

[View area lower bound height](#)^[155]

[View area upper bound distance](#)^[155]

[View area lower bound distance](#)^[155]

[View area length](#)^[155]

[Width of view area upper bound](#)^[156]

[Width of view area lower bound](#)^[156]

[Projection](#)^[156]

7.2.2 Parameters

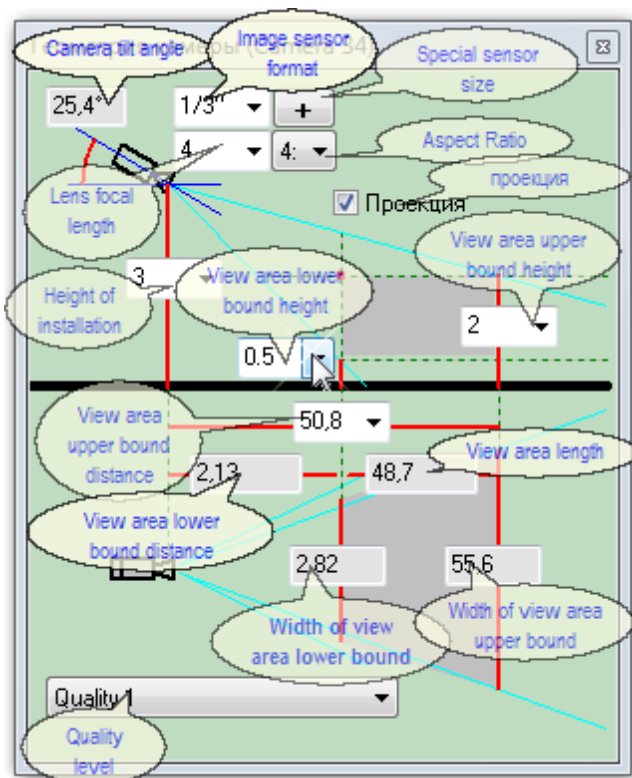


Image sensor format

The image sensor format can be only chosen from the list: **1/4"**, **1/3.6"**, **1/3.2"**, **1/3"**, **1/2.7"**, **1/2"**, **1/1.8"**, **1/1.7"**, **2/3"**, **1"**, **4/3"**. Choose in this box a value given in the camera specification.

The most popular formats are **1/4"** (for the mini- and DOME-cameras), **1/3"** (for the better part of cameras) and **1/2"** (for the certain cameras of extended quality). Formats **1/3.6"**, **1/3.2"**, **1/2.7"**, **1/1.8"**, **1/1.7"**, **4/3"** are used in IP cameras and digital photo cameras.

The image sensor format influences all the **calculated** parameters.

When moving the cursor to the image sensor box the information on horizontal and vertical view angles of lens appears.

In case of modeling camera has image sensor format, which is absent in the list, use the **Special sensor size** button to activate [Special sensor size box](#)^[157]. In this box it is possible to specify any image sensor size, view angles and aspect ratio.

If the **special sensor size** is assigned to the camera, sensor sizes in millimeters are displayed in this box.

Lens focal length

The values can be chosen from the list or typed from keyboard, e.g. when using the **varifocal lenses**.

Choose a value given in the lens **specification** in this box.

It is assumed that the **lens format** equal to or larger than the camera **image sensor format** is used.

The **lens focal length** influences all the **calculated** parameters.

When moving the cursor to the lens focal length box the information on lens view angles appears.

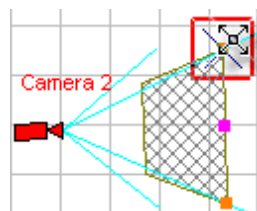
If in lens' specification there are view angles which are different from standard ones, you can choose focal length value in order to get view angles that are close to the angles in the specification.

It is possible to specify **special sensor size**. To do this open [Special sensor size box](#)^[157] by clicking **Special sensor size** button. In this box you can specify any image sensor size using specification values of view angles.

Often wide-angle lenses have larger view angles than the standard ones because of optical distortion on the image edges.

Focal length can be chosen from the list or typed into this box or duplicate boxes on the [Tool bar](#)^[85] of the Graphics window and on the [3D window](#)^[172].

It is convenient to change lens focal length of active camera on layout in the [Select/Edit](#)^[87] mode, by moving grips at the corners of view area projection.



Aspect ratio

You can choose Aspect ratio (ratio of the horizontal image size to the vertical size): 4:3 or 16:9.

All analog cameras with standard video signal have 4:3 Aspect ratio.

Some IP cameras have 16:9 Aspect ratio (wide-screen image).

Some IP cameras allow to switch Aspect ratio between 16:9 & 4:3.

In case of modeling camera has image sensor format, which is absent in the list, use **Special sensor size** button to activate [Special sensor size box](#)^[157]. In this box you can specify any image sensor size using specification values of view angles.

If non standard Aspect ratio or [sensor format](#)^[153] is assigned to a camera, "custom" is displayed in this box and the box becomes inaccessible. To make it accessible choose any standard sensor format.

Special sensor size

Clicking this button will open **Special sensor size box**. In the box it is possible to specify any image sensor size and Aspect ratio.

See more: [Special sensor size](#)^[157]

Camera installation height

Height of installation can be chosen from the list or typed. The height of installation influences all calculated parameters.

Camera tilt angle

Camera tilt angle is a calculated parameter and can not be edited directly. The camera tilt angle is an angle between the **main optical axis** of camera lens and a horizontal.

Though in most of the cases the camera tilt angle is not interesting to designer, VideoCAD is displaying it for information.

View area upper bound height

The **height of view area upper bound** can be chosen from the list or typed. In the horizontal projection of the calculated view area the space above the upper bound height is not taken into consideration. Together with [view area upper bound distance](#)^[155] it completely determines a camera tilt angle and all **calculated** parameters through it.

Height of calculating Spatial resolution

If in the [Height](#)^[161] box of the **Spatial resolution box**, **AUTO** is chosen, then calculation of spatial resolution in the horizontal projection is carried out at the middle height between the **heights of the view area lower bound and the view area upper bound**.

View area lower bound height

The **height of view area lower bound** can be chosen from the list or typed. In the horizontal projection of the calculated view area the space below the lower bound height is not taken into consideration.

The height of view area lower bound influences the following **calculated** parameters:

[View area lower bound distance](#)^[155]

[View area lower bound width](#)^[156]

Height of calculating Spatial resolution

If in the [Height](#)^[161] box of the **Spatial resolution box**, **AUTO** is chosen, then calculation of spatial resolution in the horizontal projection is carried out at the middle height between the **heights of the view area lower bound and the view area upper bound**.

View area upper bound distance

When a camera is located above the **view area upper bound**, a **view area upper bound distance** is the **maximal distance of surveillance**. The view area upper bound distance is chosen from the list or typed. The view areas are calculated up to this distance. Together with the [height of view area upper bound](#)^[155], the **view area upper bound distance** completely determines the camera tilt angle and all the calculated parameters through it.

When the **view area upper bound distance** is less than the [view area lower bound distance](#)^[155], the maximal distance of surveillance becomes the **view area lower bound distance**.

View area lower bound distance

The **view area lower bound distance** is a **calculated parameter** and can not be edited.

View area projection length

The **view area projection length** is a **calculated parameter** and can not be edited. When there is an **actual view area projection**, the view area projection length displays the absolute value of

difference between the upper and the lower bound distances of view area projection.

When there is no **actual view area projection**, the parameter doesn't have any sense and is not displayed. The parameter displaying enhances the convenience in use when it is required to obtain the length of view area projection.

Width of view area projection upper bound

The **width of view area projection upper bound** is a **calculated** parameter and can not be edited.

According to the "[Projection](#)^[156]" switcher state the **width of view area projection upper bound** displays the camera view area width at the point of intersection between the camera view area bound and the view area projection upper bound, or the view area projection edge width between the lower bound and the upper one.

Width of view area projection lower bound

The **width of view area projection lower bound** is a **calculated** parameter and can not be edited.

According to the "[Projection](#)^[156]" switcher state the **width of view area projection lower bound** displays the camera view area width at the intersection point between the camera view area bound and the view area projection lower bound, or the view area projection edge width between the lower bound and the upper one.

Projection

A "**Projection**" is a switcher determining a way of calculation:

- The [view area lower bound distance](#)^[155] and the [view area lower bound width](#)^[156] when the view area is narrowing upwards on the **view area lower bound distance**;
- The [view area upper bound distance](#)^[155] and the [view area upper bound width](#)^[156] when the view area is narrowing downwards on the view area **upper bound distance**;

When the switcher is checked, the view area bound distance and width are calculated according to narrower level of the view area opposite bound. In this case all the points of the calculated view area horizontal projection from the lower bound up to the upper one hit in the camera view area.

When the switcher is not checked, the distance up to the camera view area bound intersection with the upper or lower bounds and the width of this bound are calculated.

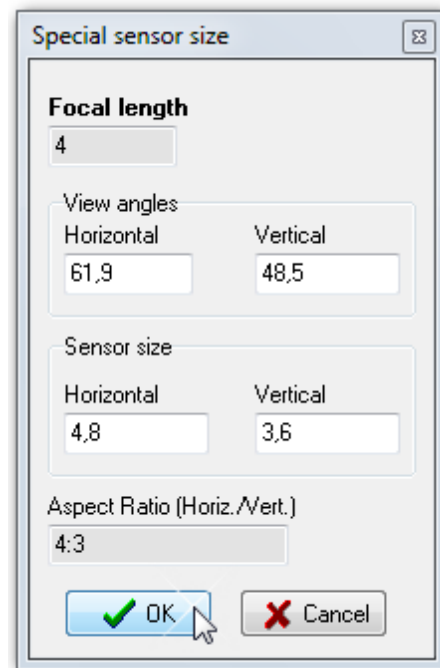
When the view area is not narrowing towards the opposite bound, the switcher doesn't have any sense and is not displayed.

External link: ["The principles of CCTV design in VideoCAD. Part I. Camera view area"\(*.pdf\)](#).

7.2.3 Special sensor size

In this box it is possible to specify any **Image sensor size** and **Aspect ratio**.

These parameters can be specified either directly or through view angles values.



The screenshot shows a dialog box titled "Special sensor size". It contains the following fields and values:

- Focal length:** 4
- View angles:**
 - Horizontal: 61,9
 - Vertical: 48,5
- Sensor size:**
 - Horizontal: 4,8
 - Vertical: 3,6
- Aspect Ratio (Horiz./Vert.):** 4:3

At the bottom, there are two buttons: "OK" (with a green checkmark icon) and "Cancel" (with a red X icon). A mouse cursor is pointing at the "OK" button.

For direct specifying sensor size using known values just enter sizes in millimeters into corresponding boxes on the **Sensor size panel**.

For specifying image sensor size **through known view angles** and **lens focal length**:

- Check value in the **Focal length** box.
- Enter **known view angles** values in degrees into corresponding boxes on the **View angles** panel.

After that on the **Sensor size panel** calculated values of image sensor sizes will appear. In the **Aspect ratio** box the calculated ratio of horizontal image size to vertical is shown.

To save changes click **OK**.

To cancel changes click **Cancel**.

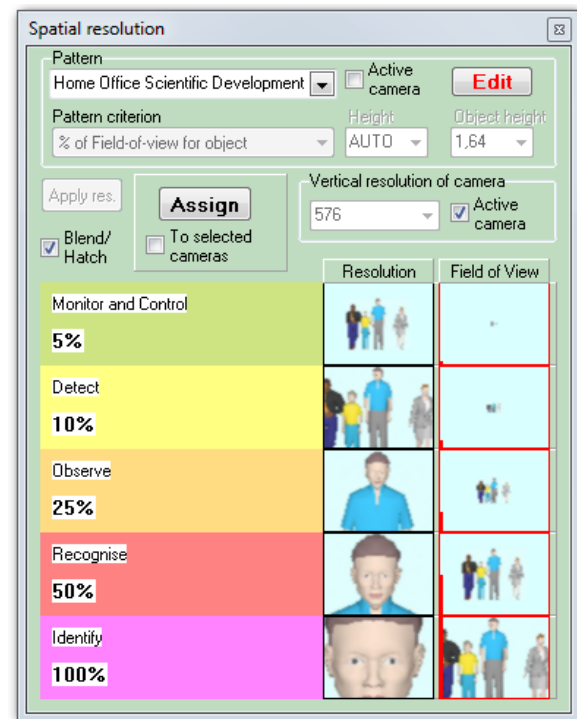
7.3 Spatial resolution

Graphics window

Tool bar

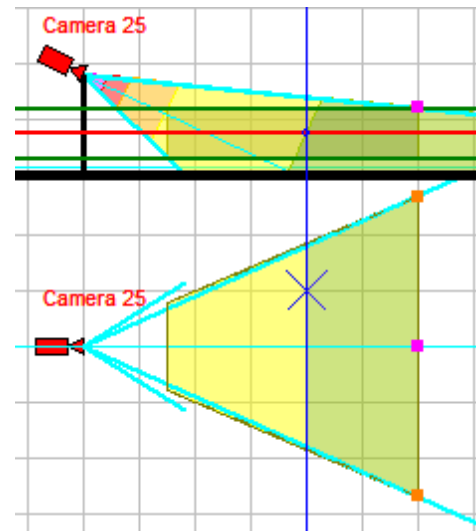


Spatial resolution



View area of cameras can be divided into **regions** based on the following **criteria**:

- vertical spatial resolution (pixels/meters, pixels/foot);
- vertical field of view size (meter, foot);
- vertical number of pixels covered by an object of the specified height (meter, foot);
- the part of the frame height covered by an object of the specified height (meter, foot).



*These Criteria relates to the **spatial resolution** or the **field of view size**. For short, in the definitions, it is mentioned the **spatial resolution only** (the Spatial resolution box, the Spatial resolution pattern, the Spatial resolution criterion ...), except of special cases.*

In the **Graphics window**, projection of different **regions** of view area can be [filled](#)^[84] by different color and (or) type of hatching.

Spatial resolution pattern

- contains information about the **regions** and how they are filled and (or) hatched.

VideoCAD project can contain up to **30** spatial resolution patterns. Each pattern can include up to **10** regions. You can assign different patterns to different cameras.

Spatial resolution box

- is designed for creating and editing the patterns of spatial resolution and field of view size visualization.

In the box there are prepared spatial resolution patterns according to the following criteria:

- Home Office Scientific Development Branch;
- Home Office Guidelines for identification;
- P 78.36.008-99.

Individual patterns can be customized according to any other criteria related to the spatial resolution or the field of view size.

Also in the box there are examples of images of group of people are automatically displayed for each region of spatial resolution.

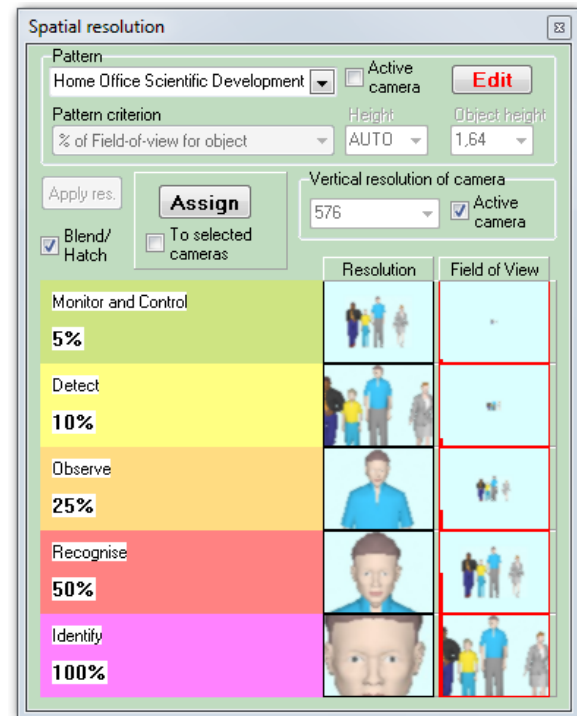
It is convenient to keep the Spatial resolution box opened during the analysis of spatial resolution in the Graphics window. Comparing color of regions on the layout with color in table in the spatial resolution box, on the images in the [Resolution](#)^[163] and [Field of view](#)^[163] columns you can immediately see the expected resolution and field of view size at every point of view area of each camera.

See further: [Tools in the Spatial resolution box](#)^[160], [Work with the Spatial resolution box](#)^[166]

See also: [Spatial resolution](#)^[84], [Fill projection](#)^[83], [Visualization of cameras' control area projections and spatial resolution inside them](#)^[240]

7.3.1 Tools

[Pattern](#)^[160]
[Active camera](#)^[160]
[Edit](#)^[160] [Edit/Save](#)^[160]
[Pattern criterion](#)^[160]
[Height](#)^[161]
[Object height](#)^[161]
[Apply res.](#)^[161]
[Blend/Hatch](#)^[161]
[Assign](#)^[162]
[To selected cameras](#)^[162]
[Vertical resolution of camera](#)^[162]
[Table of regions](#)^[162]
[Resolution](#)^[163]
[Field of view](#)^[163]
[Type of hatching combo box](#)^[163]
[Colors of regions button](#)^[163]
[How to add your own images to the Table of regions](#)^[164]



Pattern



In this combo box the name of the chosen pattern of spatial resolution is shown. You can choose any pattern from 30 patterns of spatial resolution. Parameters of the chosen pattern are displayed and can be edited in the Spatial resolution box.

The name of the pattern can be edited in this box, when the [Edit](#)^[160] button is pressed.

The box is inaccessible when the [Active camera](#)^[160] box is checked.

Active camera

If the checkbox is checked, a pattern assigned to the active camera is automatically displayed in the spatial resolution box. The [Pattern](#)^[160] combo box will become inaccessible for editing.



Edit the chosen pattern. Clicking on the **Edit** button makes parameters of the chosen pattern accessible for editing. The button caption is changed to **Save** - stop editing and save the modified pattern.

Pattern criterion

Pattern criterion	Height	Object height
Pixel for object	AUTO	1,64

In the box you can choose a **criterion** according to which regions in the pattern will differ.

You can choose one from 4 criteria:

- **Pixel per meter** (Pixel per foot) - vertical spatial resolution (pixels/meters, pixels/foot);.
- **Field-of-view height** - vertical field of view size (meter, foot);
- **Pixel for object** - vertical number of pixels covered by an object of the height specified in the [Object height](#)^[161] box (meter, foot); .
- **% of Field-of-view for object** - the part of the frame height covered by an object of the height specified in the [Object height](#)^[161] box (meter, foot).

Meters or feet as a unit of height are selected automatically depending on the [format of measurements](#)^[107] in the project.

*For the criteria **Pixel per meter (Pixel per foot)**, **Pixel for object** the spatial resolution depends on the **vertical resolution** specified in the [Vertical resolution of camera](#)^[162] box.*

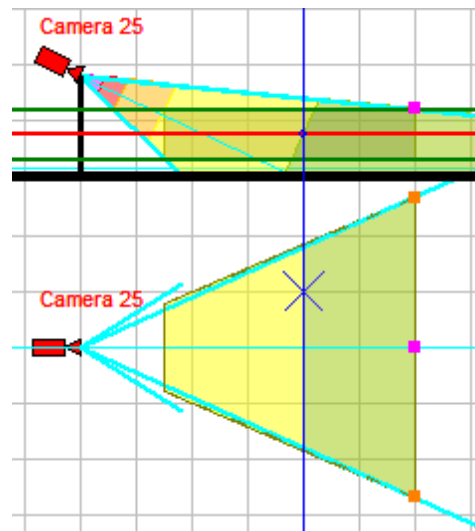
Height

Height of measuring the spatial resolution in the horizontal projection (height of the **horizontal red line** on the picture).

If the main optical axis of the camera is not parallel to the horizon, the spatial resolution in the horizontal projection depends on the height above the ground.

The **AUTO** indicates that the height is equal to the middle height between the [view area lower bound height](#)^[155] and the [view area upper bound height](#)^[155].

The box is accessible for editing in the [Editing](#)^[160] mode.



Object height

Height of the object for the criteria associated with an object: **Pixel for object** and **% of Field-of-view for object**.

The box is accessible for editing in the [Editing](#)^[160] mode.

Apply res.

Apply changes of [criterion parameters](#)^[160] in the [Table of regions](#)^[162].

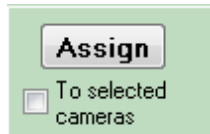
As a result of clicking this button, changes in parameters of regions will be [checked for correctness](#)^[166], then if they are correct, will be applied on the Graphics window.

Blend/Hatch

Show the regions in the Spatial resolution box hatched or filled by blend translucent colors.

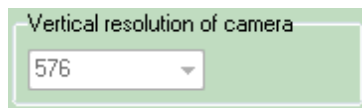
This box affects displaying regions in the Spatial resolution box only. Hatch or fill regions in the Graphics window can be determined separately for each camera using the [Fill projections](#)^[83] button.

Assign



Assign **chosen pattern** to the **Active camera**. If the **To selected cameras** box is checked, then the chosen pattern is assigned to **all selected cameras**.

Vertical resolution of camera



Attention! The purpose of this combo box differs in Starter, Lite and Professional versions!

Vertical resolution for calculating bounds of regions in the **Graphics window** and modeling [images](#)^[163] on the far bounds of regions in the [Table of regions](#)^[162].

Images on the bounds of regions depend not only on the [criterion value](#)^[160], but also on the **camera resolution**.

Thus, for **criteria related to the number of pixels which covers a specified height (Pixel per meter, Pixel for object)** value of the criterion determines the **spatial resolution**, ie how detailed the scene is photographed. In this case, **Vertical resolution of camera** determines the size of the **field of view**.

Conversely, for **criteria related to the height of the field of view (Field-of-view height,% of Field-of-view for object)** criterion value determines the size of the **field of view**. In this case, **Vertical resolution of camera** determines the **spatial resolution**, ie how detailed the scene is photographed.

This box affects the images in the [Resolution](#)^[163] and the [Field of view](#)^[163] columns in the **Spatial resolution box**.

In the VideoCAD Lite and Starter versions this box also affects visualization of the regions in the Graphics window. If the item [Processing>Resolutions](#)^[172] in the main menu of the 3D window is checked, then number of pixels of the image in the 3D windows will be limited by the value in this box.

If number of pixels is not set (N/A), calculation is performed for vertical 576 pixels, what corresponds to analog camera.

Table of regions

In rows of this table you can see and [edit](#)^[166] parameters of regions of the chosen spatial resolution pattern.

The bottom row of the table corresponds the nearest to the camera region.

On the first column of the table, on the background rectangles filled by a color assigned to the region, the Name of the region and the [Criterion value](#)^[160] at the far bound of region are displayed.



Resolution column

The **Resolution** column contains fragments of images with people at the far bounds of each region. **These are fragments of images, not whole images.** Field of view of the fragments is less than the real field of view, but the resolution of people corresponds the real images exactly.

*On the images in the **Resolution** column, you can see with which resolution people at the far bound of each region will be visible.*

Field of view column

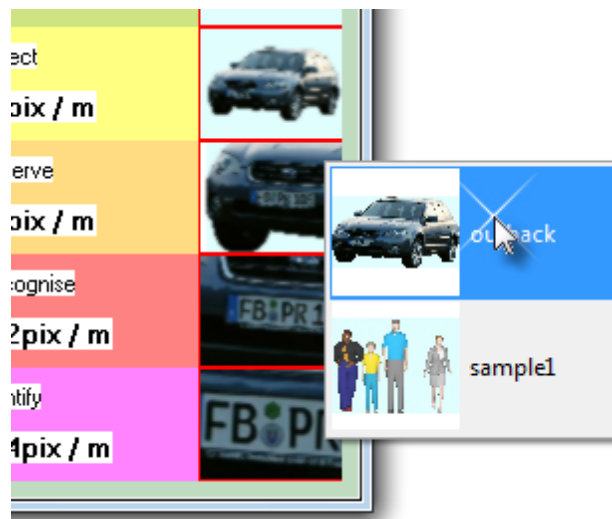
The **Field of view** column contains **whole compressed images** of people with the **field of view** at the far bounds of each region. **Resolution** of these images is less than resolution of the real image, but the **field of view** corresponds the real images exactly.

*On the images in the **Field of view** column, you can see which part of the field of view people at the far bound of each region will cover.*

Images in **Resolution** and **Field of view** columns are automatically generated according to the **criterion value** of each region and the [Vertical resolution of camera](#)^[162] value. The images visualize the boundary values of the criterion.

The height of "men in blue shirt" is 2 meters (about 6.5 feet).

Right click on any image in the **Table of regions**. Pop up menu will appear. With the help of this menu you can change image in the **Table of regions**.



In the [Editing](#)^[160] mode the **Names of regions** and the **Criterion values** become accessible for editing. In addition the **Type of hatching** combo boxes [DiagCros](#)^[161] and **Colors of regions**

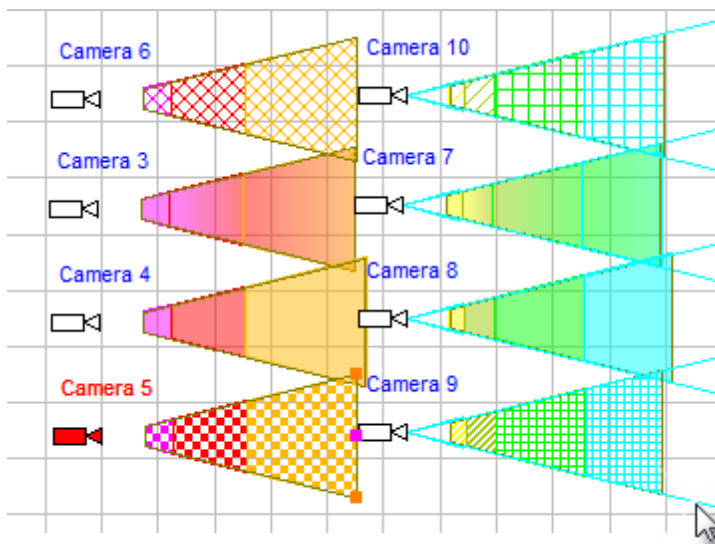
buttons  appear.



In the **Type of hatching** combo boxes  you can choose type of hatching for each region.

Hatching will be visible in the **Spatial resolution box** when the [Blend/Hatch](#)^[161] box is not checked. In the **Graphics window**, hatching of the chosen type will be shown for cameras, which have chosen **Hatching** in the menu of the [Fill projections](#)^[83] button.

Color of region is the same for filling and for hatching.



How to add your own images to the Table of regions

Table of regions can display any images in ***.jpg** format, for example: photos of objects, etc. Adding your own images you can see how your objects will look at the far bounds of regions.

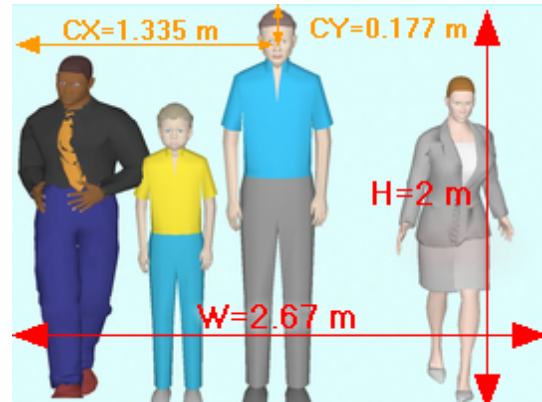
To add your own images to the Table of regions:

1. Take any ***.jpg** file, digital photo image, made by camera with resolution no less than resolution of your CCTV cameras.
2. Name your file by the following composite name: **<anyname>,<W>,<H>,<CX>,<CY>.jpg**

Thus the name is a string composed of the comma separated values:

<anyname> - any string without spaces and special characters;
<W> - image width, in meters;
<H> - image height, in meters;
<CX> - X coordinate of a spot on the image, at which the camera should be pointed (in meters);
<CY> - Y coordinate of a spot on the image, at which the camera should be pointed (in meters);

Origin of coordinates is on the top left corner of the image.



Example of file name:

sample1,2.67,2,1.335,0.177.jpg

3. Put your file in the VideoCAD installation directory, **/Resolution samples/** folder.
You can place several files to this folder.

4. Launch VideoCAD. Open the **Spatial resolution** box. Right click on any image in the **Table of regions**. Pop up menu will appear. With the help of this menu you can change image in the **Table of regions**.

If your file is missing in the menu, then you probably made a mistake in the filename. If the file is displayed not correctly, you probably typed wrong values of sizes in the filename.

See further: [Work with the Spatial resolution box](#)¹⁶⁶

7.3.2 Work with the Spatial resolution box

[Editing the Spatial resolution pattern](#)^[166]

[Assigning the pattern to cameras](#)^[167]

Editing the Spatial resolution pattern

1. Clear the [Active camera](#)^[160] box.
2. Choose a pattern for editing in the [Pattern](#)^[160] combo box.

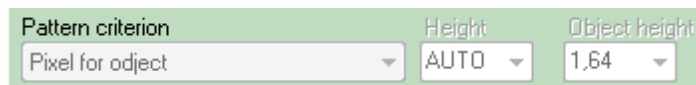


3. Click the [Edit](#)^[160] button.  Caption on this button will be changed to **Save**. Parameters of the chosen pattern will become accessible for editing.

4. If necessary, edit the Name of the pattern in the [Pattern](#)^[160] box by the keyboard.
5. Choose criterion in the [Pattern criterion](#)^[160] combo box.
6. Specify [Height](#)^[161] at which the criterion values should be calculated.

The **AUTO** indicates that the height is equal to the middle height between the [view area lower bound height](#)^[155] and the [view area upper bound height](#)^[155].

7. In case of chosen criteria is related to an object (**Pixel for object, % of Field-of-view for object**), choose the object height in the [Object height](#)^[161] box.



8. If the **type of hatching** is needed to show, clear the [Blend/Hatch](#)^[161] box.
9. Specify values of the [criterion](#)^[160] at far bound of each region in the [Table of regions](#)^[162].

When editing the values of criteria, you must comply with the following rules:

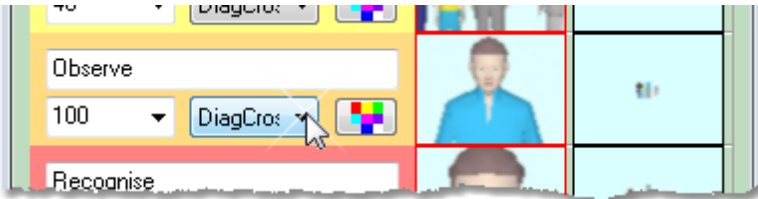
9.1 The bottom row of the table should correspond to the closest to the camera region, and thus must have:

- maximum spatial resolution (the maximum value of the criterion **Pixel per meter**);
- any object must cover the maximum number of pixels (the maximum value of the criterion **Pixel for object**);
- minimum height of the field of view (the minimum criterion **Field-of-view height**);
- any object must cover maximum part of the field of view (the maximum value of the criterion **% of Field-of-view for object**).

9.2 The values of the criteria should be edited consistently from region to region, starting from the closest to camera region (bottom row). For example, if the criterion is Pixel per meter, then in the bottom row should be the maximum spatial resolution, and in each subsequent row criterion value must be less than the row below.

If this rule is violated then the boxes with wrong values would be red highlighted.

9.3 In the [editing mode](#)^[160], the table unfolds and shows the **maximum number of region in the pattern (10)**. If you need a smaller number of regions, the "extra" regions must have equal values of the criterion. "Unnecessary" regions should be placed one after another at the top of the table.



10. You can edit the Name of each region in the **Name** box, choose a color that will be used for displaying the region in the Graphics window by clicking on the [Color button](#)^[163] , choose

hatch style in the [Hatch style](#)^[163]  [DiagCros](#) combo box.

*Hatching will be visible in the **Spatial resolution** box when the [Blend/Hatch](#)^[161] box is not checked.*

*In the **Graphics window**, hatching of the chosen type will be shown for cameras, which have chosen **Hatching** in the menu of the [Fill projections](#)^[83] button.*

11. On the images in the [Resolution](#)^[163] column, you can see with which resolution people at the far bound of each region will be visible.

On the images in the [Field of view](#)^[163] column, you can see which part of the **field of view** people at the far bound of each region will cover.

Sample images are correct for the cameras with vertical resolution specified in the [Vertical resolution of camera](#)^[162] combo box.



12. When editing pattern will be finished, click the [Edit/Save](#)^[160] button once again.

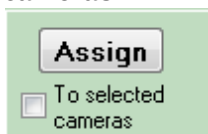
▣ Assigning the pattern to cameras

To assign a pattern, displayed in the **Spatial resolution** box to a camera:

1. [Activate](#)^[78] the camera.

2. Click on the [Assign](#)^[162] button.

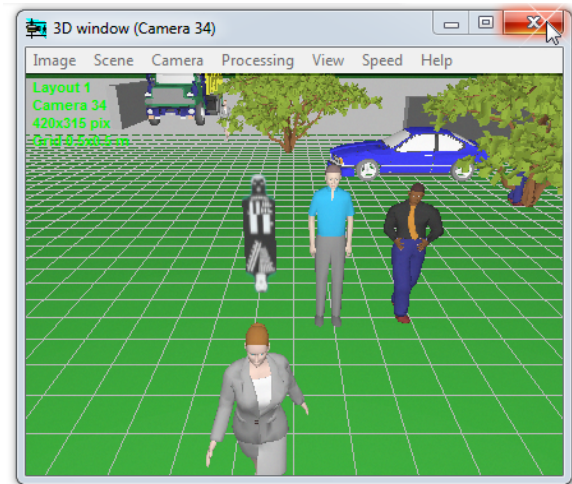
If the [To selected cameras](#)^[162] box is checked, then the chosen pattern is assigned to **all selected cameras**.



See also: [Spatial resolution](#)^[84], [Fill projection](#)^[83], [Visualization of cameras' control area projections and spatial resolution inside them](#)^[240]

7.4 3D window

Graphics window
Main menu
View
3D window



The 3D window is designed for 3D modeling images from the active camera.

3D window can display:

- **Ground surface.** The ground color is set on the tab [3D modeling](#)^[192] in the Options Box.
- **Grid.** The presence, step and location of the grid are determined by the similar [grid parameters](#)^[86] in the graphics window.
- **Background**^[111]. The Background is not visible by default. You can make the background visible in the Main menu of 3D window.
- **3D constructions;** represent stretched throughout the height [2D constructions](#)^[90] in the graphics window.
- **3D models.** These are prepared 3D models of people, cars and other objects. See more: [3D model](#)^[98]
- **3D images.** Usual raster images can be placed in the 3D space. See more: [3D image](#)^[100]
- **Cameras.** Cameras are represented as 3D models.
- **Camera view areas.** Are displayed as semi-transparent figures for those cameras which [View area edges](#)^[82] displaying is switched on.
- **The fragment of the test chart EIA1956** for the visual estimation of the current horizontal and vertical resolution.
- **Titles**^[172]. At the left top corner the main image parameters are displayed.

Visibility of some objects can be switched in the [Main menu](#)^[171] of the 3D window.

Location and editing these objects are carried out in the **horizontal projection** of the [graphics area](#)^[75]. In the **3D window** the result of these actions can be observed.

3D window allows to:

- disclose the view area distortions, arising from obstacles;
- [save](#)^[171] obtained images in the static files;
- see at the design stage that, for what the video surveillance system is made - **images from**

video cameras.

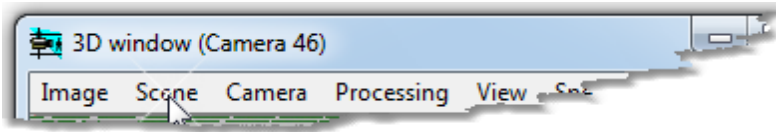
If image in the 3D window is distorted, redrawing the image is too long or there are other artifacts, see [Errors in 3D window](#)^[174].

See also: [3D window main menu](#)^[171], [3D model](#)^[98], [3D image](#)^[100], [Errors in 3D window](#)^[174].

External link: "[The principles of CCTV design in VideoCAD. Part 3. 3D modeling in VideoCAD](#)"(.pdf)*

⌵

7.4.1 Main menu



Image

[Save as *.bmp \(*.jpg, *.gif, *.tif, *.png\)](#)^[171]

[Printer setup](#)^[171]

[Print](#)^[171]

Processing

[Compression](#)^[171]

[Resolution](#)^[172]

View

[Title](#)^[172]

[PTZH frame](#)^[172]

[Background](#)^[173]

[Test chart](#)^[173]

Help

Image > Save as *.bmp (*.jpg, *.gif, *.tif, *.png)

Save the static image in the 3D window in any format from the following: *.bmp, *.jpg, *.gif, *.tif, *.png.

Image > Printer setup

Choosing this item opens a standard dialog box of current printer setup in Windows.

Image > Print

Print image in the 3D window.

Processing > Compression

The item opens a submenu, in which the **image compression level** can be chosen.

Compression levels may differ from the compression levels in the settings of different DVR or IP cameras. To determine a correspondence use the visual image comparison.

Obtained image compress by the JPEG algorithm for approximating the image in the 3D window to the real image from video cameras to exactly estimation the possibilities of detection, identification and reading

Using in your DVR algorithms different from JPEG is not generally an obstacle for compression modeling with the help of JPEG algorithm. Although other algorithm artifacts differ from JPEG artifacts, the general amount of information correspondence that can be determined by the careful visual image comparison is enough for modeling.

Processing > Resolution

If this item is checked, then the resolution in the 3D window will be limited by value in the [Vertical resolution of camera](#)^[162] box, set for the active camera in the **Spatial resolution box**

The resolution will be limited in case of vertical size of the image in the 3D windows is more than value in the [Vertical resolution of camera](#)^[162] box.

View > Title

Place the following information in the left upper corner of the image:

- **Name** of the [layout](#)^[204] on which the active camera is placed.
- Active camera **name**.
- Current **image sizes** in pixels.
- The [grid](#)^[86] **step**, if the grid is displayed.

View > PTZH frame

PTZH frame (Pan-Tilt-Zoom-Height) allows operating camera similarly to PTZ one and additionally change **camera's installation height**.

After clicking this item the camera's **field of view** extends, and the objects being off view area, for increasing the convenience of camera's adjustment, become visible. Real field of view is limited by **orange frame**.



Above the frame the buttons, which changes [view area upper bound distance](#)^[155]  and [view area upper bound height](#)^[155] , are located. Current distance and height values are digitally shown under the buttons.

*It is recommended to set **view area upper bound height**, which is equal to maximal height of observed objects, and do not change it further. Further adjust camera's inclination by changing only the **view area upper bound distance**.*

On the right and to the left of the frame there are camera rotation buttons  .

Under the frame there are buttons, which change the [height of camera installation](#)^[154]  . Current value of **height** is digitally shown above the buttons. Near by them the [lens focal length](#)^[153]  **combo box** is located. Value in the box can be selected from the list or entered from the keyboard.

Using these tools it is possible to rotate the camera in both planes, change **lens focal length** and

height of installation.

To change the position **on one step** click corresponding button. For **continuous moving** bring the cursor to the button, then press it and do not release the left mouse button. For precise position adjustment do the same, but with pressed **Ctrl**.

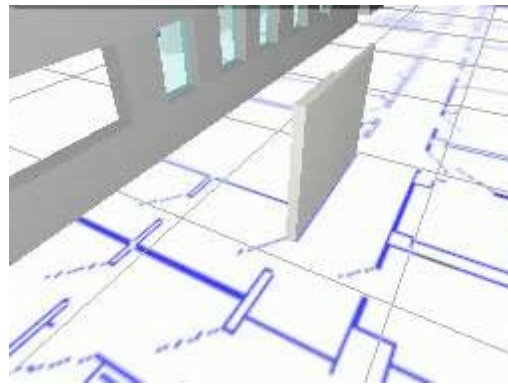
In the PTZH frame mode you can pan and tilt the camera by moving the image like moving drawing in the Graphics window. Press left mouse button, move cursor with the button pressed then release the mouse button. Camera tilt angle is changed through changing **view area upper bound distance**. But when **Ctrl** is pressed, the tilt angle is changed through changing **view area upper bound height**. You can pan camera using **arrow keys**.

Together with [Monitor window](#)^[175] this tool offers a [new method](#)^[222] of 3D CCTV design.

View > Background

Show or hide a background in the 3D image.

In case of vector background you can adjust [background resolution](#)^[193] in the 3D window.

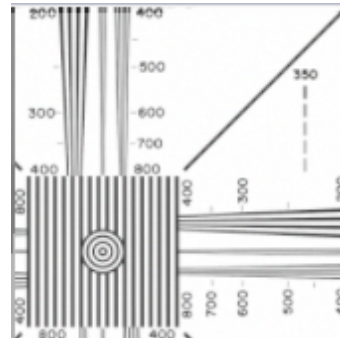


See more: [Background](#)^[111]

View > Test chart

Place in the right top corner the image fragment of the standard test chart EIA1956 for the visual estimation of the current horizontal and vertical resolution.

If in the Options box on the [3D modeling](#)^[192] tab Smoothing>Test chart box is not checked, then the time of repainting will lessen, but the accuracy will lower.



Help

Open the Help system topic with the information about **3D window**.

7.4.2 Errors in 3D window

The **quality of image modeling in the 3D window** and the speed of its refreshing depends much on **your graphics card features**. To get maximum realism set the maximum quality of **Open GL** images.

On some outdated graphic cards **visible pixelization, errors** and **the lack of image** are possible. This is not a program fault. Some new graphic cards need an additional setting to get the maximum realistic quality.

The speed of image updating also depends on the quantity of the displayed 3D models.

If **errors are visible** on the image in the **3D window** or the computer buzzes at the **3D window** displaying, first of all **update the graphics card driver** to the latest version accessible on the manufacturer website. *The drivers which are used in Windows by default as a rule do not support hardware acceleration.*

Then try to change **Hardware acceleration** in the Display Properties box.

How to change the Hardware acceleration in Windows XP:

- Click by right mouse button on free area in the desktop.
- In the pop-up menu choose **Properties**.
- Choose **Setting** tab.
- Click **Advanced** button.
- Choose **Troubleshoot** tab.
- Drag to the left the **Hardware acceleration** slider.
- Click **OK**, and then click **OK** again.
- Restart the computer when you are prompted to do so.
- Check the Image in the **3D window** at different positions of the **Hardware acceleration** slider.

Then try to reduce **Model space** on the [3D modeling](#)^[192] tab in the **Options** box.

If failures or distortions remain, - a more high-end graphics card is necessary for 3D modeling.
*For the best quality it is necessary to use a graphics card with **OpenGL** hardware support.*

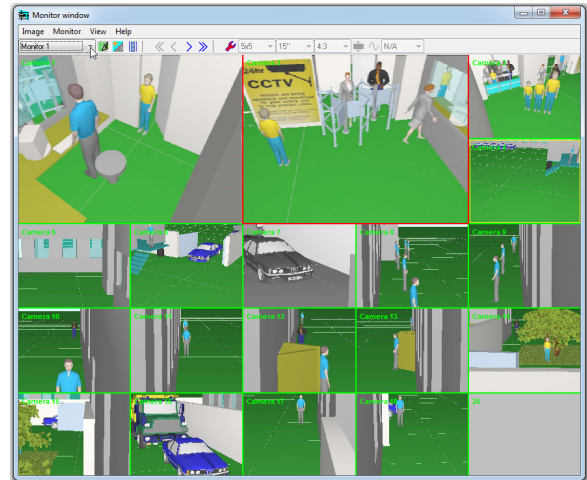
Redraw speed of the image depends also on number and complexity of displayed 3D models and the size of opened 3D window.

If the image is redrawn too slowly and that hinder operation in the Graphics window, try to adjust VideoCAD for the most comfortable working on your equipment and your projects:

Mark the [Redraw 3D image only by clicking](#)^[193] box on the [3D modeling](#)^[192] tab in the [Options box](#)^[185]. After that the image in 3D window will be redrawn automatically only at activation of cameras. To force redrawing click on the image.

7.5 Monitor window

[Graphics window](#)
[Main menu](#)
[View](#)
[Monitor window](#)



Monitor window is intended to model monitors of video surveillance system. However the field of application of this tool is much wider.

Together with [3D window](#)^[169] the Monitor window allows to project video surveillance system, working directly with images. Thus all necessary changes on the drawing are carried out automatically.

Monitor window logically finishes the information transfer process in video surveillance system "from a real object to an operator" and thus, allows to model the video surveillance system as a whole.

In Monitor window there can be up to 10 monitors. On each monitor up to 100 images from cameras could be displayed simultaneously or with the dividing into screens.

Using Monitor window in order to achieve the best result it is possible to compare various variants of cameras' placement.

Monitor window is useful at designing an operator's workplace. It is possible to estimate the detail of images from cameras in split screen, an option to display images from different cameras in various sizes, choose optimal quantity and sizes of monitors as well as optimal distance of watching these monitors, taking into account features of projected video surveillance system.

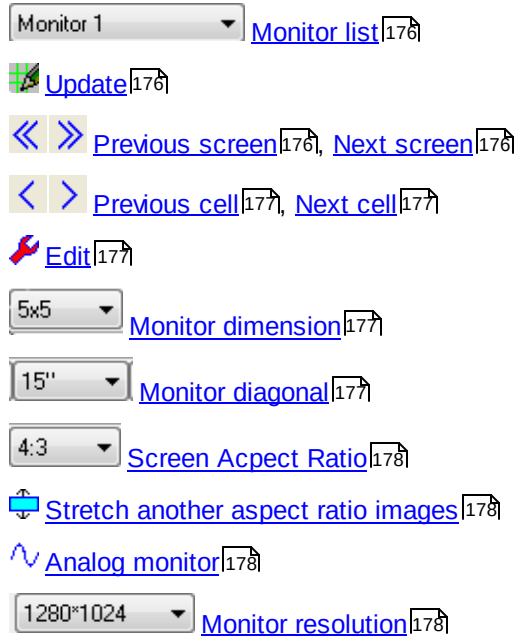
Together with [PTZH frame](#)^[172] this tool offers a [new method](#)^[222] of 3D CCTV design.

See also: [Work with Monitors](#)^[183], [Monitor window Tool bar](#)^[176], [Monitor window Main menu](#)^[179], [Monitor window Pop-up menu](#)^[181].

External link: ["The principles of CCTV design in VideoCAD. Part 3. 3D modeling in VideoCAD"\(*.pdf\)](#)

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7.5.1 Tool bar



Monitor 1 **Monitor list**

In the combo box there is a name of displayed monitor. It is possible to choose other monitor. In VideoCAD there are 10 monitors, in which the set of cameras and the parameters are adjusted independently.

To rename the displayed monitor use item **Main menu** [Monitor>Rename](#)^[180].

Update

Update all images on the displayed monitor.

Monitor window itself does not generate 3D images, but uses the ready images which are created in [3D window](#)^[169] and are stored in the memory that allows to work simultaneously with a big quantity of 3D images without decreasing program's speed.

As a result of clicking this button, for some time **3D window** will appear, in which the images from all cameras will be modeled according to saved parameters of the cameras.

To update the image in one cell click it by the right mouse button and choose in the pop-up menu [Update](#)^[181].

Previous screen, Next screen

Each monitor consists of 100 cells, but it is also possible to display a smaller quantity of cells simultaneously. The quantity of simultaneously displayed cells is chosen in the [Monitor dimension](#)^[177] combo box.

Clicking the buttons **Previous screen** and **Next screen** shift the displayed cells on the **quantity of simultaneously displayed cells**.

*For example, if the monitor's dimension is 2x2, 4 cells are simultaneously displayed. If cells 5,6,7,8 are displayed, as a result of clicking the **Previous screen** button - cells 1,2,3,4 will be displayed, and by clicking the **Next screen** button - cells 9,10,11,12 will be displayed.*

Thus, each monitor can have several screens.

Previous cell, Next cell

Each monitor consists of 100 cells, but it is also possible to display a smaller quantity of cells simultaneously. The quantity of simultaneously displayed cells is chosen in the [Monitor dimension](#)^[177] combo box.

Clicking the buttons **Previous cell** and **Next cell** shift displayed cells on one cell.

*For example, if monitor's dimension is 2x2, 4 cells are simultaneously displayed. If cells 5,6,7,8 are displayed, as a result of clicking the **Previous cell** button - cells 4,5,6,7 will be displayed, and by clicking the **Next cell** button - cells 6,7,8,9 will be displayed.*

Edit

If this button is pressed, the **monitor editing tools** become available:

[Monitor dimension](#)^[177]
[Monitor diagonal](#)^[177]
[Screen Aspect Ratio](#)^[178]
[Stretch another aspect ratio images](#)^[178]
[Analog monitor](#)^[178]
[Monitor resolution](#)^[178]
[Monitor>Clear](#)^[180]
[Monitor>Rename](#)^[180]
[Clear cell](#)^[181]
[Opportunity of cameras connection to the monitor](#)^[183]
[Opportunity of moving and copying cells](#)^[184]

If this button is not pressed, monitor's editing is locked for protection against accidental change of the monitor.

Monitor dimension

In the combo box it is possible to choose quantity of simultaneously displayed cells on the current monitor.

2x2 corresponds to 4 cells, 3x3 - to 9 cells, etc.

One image can occupy 1, 4, 9 or 16 side-by-side located cells.

Changing value in the box is possible only in [Edit mode](#)^[177] of the monitor.

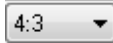
Monitor diagonal

In the combo box it is possible to choose **physical size of the screen** of the current monitor.

The size is set by diagonal, in inches. Value **N/A** corresponds to the size which is not set. If the physical size is set, possibility to change the sizes of **Monitor window** by the mouse is locked.

To get precise sizes of the Monitor window you can adjust [Monitor size factor](#)^[198] in the **Options box**.

To change value in the box is possible only in [Edit mode](#)^[177] of the monitor.



Screen aspect ratio

You can choose in the combo box screen aspect ratio. 4/3 - standard monitor, 16/9 - wide-screen monitor.



Stretch another aspect ratio images

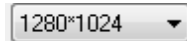
If the button is pressed then images from cameras with differing aspect ratio will be stretched.



Analog monitor

This tool allows to model analog monitors, the resolution of which is below the computers' one. If this button is pressed, the resolution of the monitor is limited to value **768x576** pixels.

To change button's state is possible only in [Edit mode](#)^[177] of the monitor.



Monitor resolution

In this box you can set resolution of the monitor. Resolution in the Monitor window will be limited by value in this box.

Changing value in the box is possible only in [Edit mode](#)^[177] of the monitor.

7.5.2 Main menu

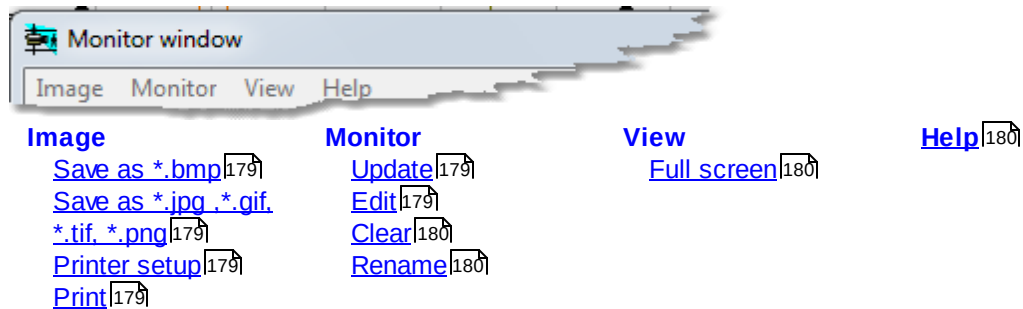


Image > Save as *.bmp

Save the image in the **Monitor window** in ***.bmp** format. The image is saved exactly as on the screen, but the obtained file will be big.

Image > Save as *.jpg, gif, *.tif, *.png

Save the image in the **Monitor window** in ***.jpg, *.gif, *.tif, *.png** formats. The image is saved compressed, at that a small loss of quality appears, but the file size turns to be small.

Image > Printer setup

Choosing this item opens a standard dialog box of current printer setup in Windows.

Image > Print

Print the image in the Monitor window.

Monitor > Update

Update all images on the displayed monitor.

Monitor window itself does not generate 3D images, but uses the ready images which are created in [3D window](#) [169] and are stored in the memory that allows to work simultaneously with a big quantity of 3D images without decreasing program's speed.

As a result of clicking this button, for some time **3D window** will appear, in which the images from all cameras will be modeled according to saved parameters of the cameras.

To update the image in one cell click it by the right mouse button and choose in the pop-up menu [Update](#) [181].

Monitor > Edit

If this item is checked, the **monitor editing tools** become available:

- [Monitor dimension](#) [177]
- [Monitor diagonal](#) [177]
- [Screen Aspect Ratio](#) [178]
- [Stretch another aspect ratio images](#) [178]
- [Analog monitor](#) [178]

[Monitor resolution](#)^[178]

[Monitor>Clear](#)^[180]

[Monitor>Rename](#)^[180]

[Clear cell](#)^[181]

[Opportunity of cameras connection to the monitor](#)^[183]

[Opportunity of moving and copying cells](#)^[184]

If this item is not checked, monitor's editing is locked for protection against accidental change of the monitor.

Monitor > Clear

Clear all cells of the displayed monitor, delete images and disconnect cameras.

Item is accessible only in [Edit mode](#)^[177] of the monitor

Monitor > Rename

Rename the displayed monitor. As a result of clicking this item a dialog box will appear, in which it is possible to enter the new name of the monitor.

Item is accessible only in [Edit mode](#)^[177] of the monitor

View > Full screen

Show the image from the displayed monitor **at full screen**.

In this mode it is possible to switch monitors sequentially using the keys **Page Up** and **Page Down**, to shift cells by cursor moving keys **Arrow left** and **Arrow right**, to change monitor's dimensions by cursor moving keys **Arrow up** and **Arrow down**.

To return to the monitor's showing in the window press any other key.

Help

Show Help section with description of **Monitor window**.

7.5.3 Pop-up menu

*The **Pop-up menu** appears as a result of clicking the right mouse button on any cell in **Monitor window**. Operations in the pop-up menu are carried out **above the camera, the image from which is present at the cell**. Therefore, in case of an empty cell items of the menu are inaccessible. Exception is the [Clear cell](#)^[181] item, which action concerns to the cell. Clicking this item deletes the image from the cell.*

[Show in 3D window](#)^[181]

[Update](#)^[181]

[Activate](#)^[181]

[Find on layouts](#)^[181]

[Clear cell](#)^[181]

Show in 3D window

Show the image in this cell in [3D window](#)^[169]. The same result will be obtained, by double click the cell.

It is convenient in **3D window** check the item of **Main menu**>[View](#)>[PTZH frame](#)^[172] and visually adjust cameras' positions. It is also possible to model parameters of the image and conditions of surveillance. Thus, it is possible to project video surveillance system, working only with images. All necessary changes on the layout will be automatically carried out. After changing the camera's parameters click the [Update](#)^[181] item.

Update

Update the image from the camera connected to this cell.

Monitor window does not generate 3D images itself, and uses ready images which are created in [3D window](#)^[169] and are stored in the memory that allows to work simultaneously with a big quantity of 3D images without program's speed decreasing.

As a result of clicking this item, for some time **3D window** will appear. In this window the image from the camera will be modeled. The image will be modeled according to saved parameters of the cameras.

*To update the images on the monitor use the [Update](#)^[176] button on the **Tool bar**.*

Activate

[Activate](#)^[77] the camera, connected to this cell.

Find on layouts

Find on layouts and select the camera, connected to this cell.

Clear cell

Delete the image from this cell and disconnect the camera from it.

Item is accessible only in [Edit mode](#)^[177] of the monitor

7.5.4 Work with Monitors

[Opening Monitor window](#)^[183]
[Preliminary monitor's adjustment](#)^[183]
[Connecting cameras](#)^[183]
[Placement of images](#)^[184]
[Updating images](#)^[184]
[Work with monitor](#)^[184]

Opening Monitor window

For opening the **Monitor window** click the [Monitor window](#)^[86]  button on **Graphics window** tool bar. At first opening in Monitor window the first monitor with the name **Monitor 1** and parameters by default will be shown.

If the monitor is already adjusted and cameras are connected to it, at first opening **Monitor window** after starting the program for some time [3D window](#)^[169] will appear, in which images from these cameras will be modeled.

*Generation of 3D images can take a lot of time. To interrupt generation press **ESC**.*

Preliminary monitor's adjustment

For monitor's adjustment, first of all switch on **edit mode** by clicking the [Edit](#)^[177]  button.

For renaming the monitor click the item in the **Main menu of Monitor window** [Monitor > Rename](#)^[180].

Select **quantity of cameras, which will be displayed** the [Monitor dimension](#)^[177] combo box.

If necessary, select **physical size** of monitor's screen in the [Monitor diagonal](#)^[177] combo box.
Having set the size it will be impossible to change the size of Monitor Window by the mouse.

If it is an **analog monitor**, click the [Analog monitor](#)^[178]  button. The button should look pressed.

In the [Monitor resolution](#)^[178] box you can specify the resolution of monitor.

Connecting cameras

Connection of cameras is available only in **Edit mode** ([Edit](#)^[177]  button is pressed).

[Select](#)^[87] necessary cameras on the layout in **Graphics window**, and then click a cell on the monitor, beginning from which these cameras should be displayed on the monitor.

For some time [3D window](#)^[169] will appear, in which images from these cameras will be modeled. After that the images will appear in cells of the monitor, beginning from a cell selected by click.

Thus it is possible to connect any quantity of the selected cameras simultaneously.

*If at the moment of clicking on the monitor **Ctrl** is pressed, new cameras will fill only free cells on the monitor. Cells already filled will not change.*

The image from each camera is modeled according to saved parameters of the camera.

Placement of images

Images can be changed in positions, copied, deleted, merged in 4,9,16 side-by-side located cells to get big images from some cameras

For placement of images the [Edit](#)^[177] mode should be switched on.

To **interchange images' positions** in two cells, first click the first cell, then the second one.

For **copying the image** from one cell in another, first click the cell, from which it is necessary to copy the image, and then on the cell, where it is necessary to copy the image. At the same time **Ctrl** should be pressed.

To **delete the image** from the cell, click it by the right mouse button and choose in pop-up menu [Clear cell](#)^[181].

To **delete all images from the monitor** choose item in the **Main menu** > [Monitor > Clear](#)^[180].

To increase images' size by **merging the cells**, place the images from one camera in 4, 9 or 16 side-by-side located cells. These cells are merged automatically.

Updating images

Monitor window does not generate 3D images itself, and uses the ready images which are created in [3D window](#)^[169] and which are stored in the memory. That allows to work simultaneously with a big quantity of 3D images without decreasing the program's speed.

That is why after changing the parameters of a camera it is necessary to **update** camera's image on the screen. To update the image in a cell click it by the right mouse button and choose in the pop-up menu [Update](#)^[181]. Then **3D window** will appear, in which the image will be modeled according to saved parameters of the camera.

To update all images click the [Update](#)^[176]  button on the Tool bar.

Work with monitor

In order not to change monitor's adjustment by accident, switch off **Edit mode** by clicking the [Edit](#)^[177]  button. The button should look not pressed.

Application of monitors at designing can be various. For acquaintance with all options of the work with monitors, see: [Tool bar](#)^[176], [Menu bar](#)^[179] and [Pop-up menu](#)^[181].

7.6 Options

Graphics window

Main menu

View

Options

The box is intended for adjusting various parameters of the program.

The box can be opened by choosing the item **View > Options**^[119] in the Main menu of the [Graphics window](#)^[74] or by double-clicking on the [Line type panel](#)^[144] or the [Font type panel](#)^[145].

The box consists of the following tabs:

- [Lines](#)^[186]
- [Fonts](#)^[188]
- [Keyboard](#)^[190]
- [Camera icon](#)^[194]
- [3D modeling](#)^[192]
- [Export](#)^[195]
- [Miscellaneous](#)^[198]
- [Tool bar](#)^[197]

All the parameter changes in the tabs become valid immediately and you can see their result.

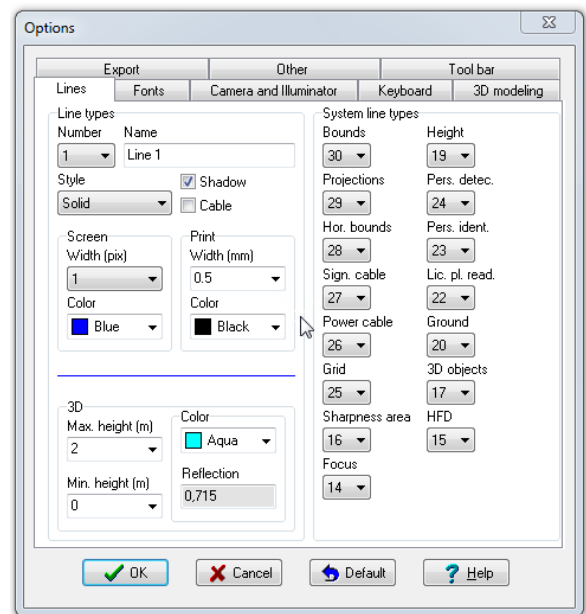
To **save** the introduced changes click **OK**.

To **cancel** the changes click **Cancel**.

To assign default values to all parameters on the opened tab click **Default**.

7.6.1 Lines

Graphics window
Main menu
View
Options
Lines



Left side of the tab

In the left side of the tab you can see and change parameters of any VideoCAD **line type**.

Up to **2000 types of lines** can be used in VideoCAD7 project.

Parameters in the left side of the tab :

- **Number** - the number of the displayed line type. Each line type has unique number from 1 to 2000.
- **Name** - the name of the line type. The name can be changed.
- **Style** - the name of line style. It can be chosen from the list (**Solid**, **Dash**, **Short Dash**, **DashDot**, **DashDotDot**, etc).
- **Cable** - If the box is checked then [line segments](#)^[92] made by this line type are considered as cables. Their lengths are included in the [cable report](#)^[139], their names present in the **Cable brand** lists in the [Signal cable](#)^[205] and [Power cable](#)^[206] length calculation boxes.
- **Screen width** - line width on the screen (pix).
- **Print width** - line width when printing (mm,inch).
- **Screen color** - line color on the screen.
- **Print color** - line color when printing.

Parameters, relating to the 3D window:

- **Maximum height** - maximum height above the ground of [3D objects](#)^[90], made by the line of this type. Also the height above the ground of [3D models](#)^[128].
- **Minimum height** - minimum height above the ground of **3D objects**, made by the line of this

type.

Heights can also take on negative values, and at that 3D model plunges under ground.

It is possible to change the heights on the [Current construction parameters panel](#)  irrespective of line type.

- **Color** - the color of **3D objects**, made by the line of this type.

Right side of the tab

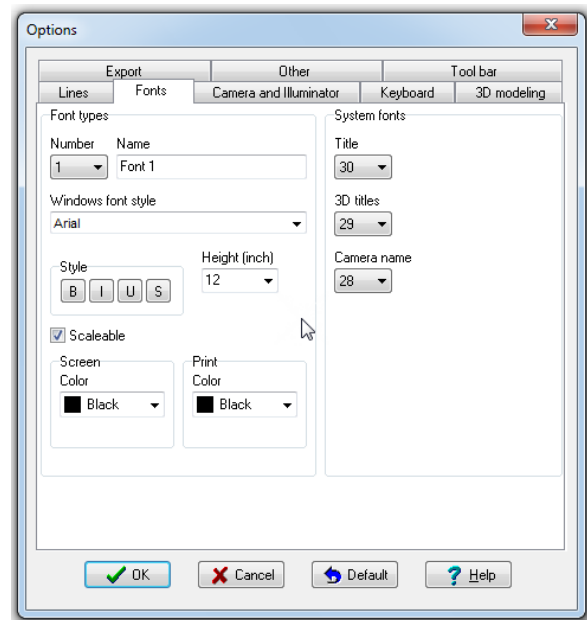
In the right side of the tab you can see and change the numbers of **line types for displaying the system objects**:

- View area edges.
- View area projection bounds.
- Horizontal bounds.
- Signal cable.
- Power cable.
- Grid.
- Ground indication.
- Height indication.
- Default line type for 3D models.

*Don't use the system lines for constructions and change their parameters without necessary.
Sometimes it leads to confusion.*

7.6.2 Fonts

Graphics window
Main menu
View
Options
Fonts



Left side of the tab

In the tab left part you can see and change parameters of any VideoCAD **font type**.

Up to **100 types of fonts** can be used in VideoCAD7 project.

Parameters in the tab left part:

- **Number** - the number of the displayed font type. Each font type has unique number from 1 to 30.
- **Name** - the name of the font type. The name can be changed.
- **Style in Windows** - the name of **font typeface**. It can be chosen from the list.

*It is necessary to remember that not all the font typefaces are scaled correctly. To use VideoCAD it is recommended to use only scalable typefaces (**True Type** or **Open Type**). Using bit-mapped fonts (e.g., MS Sans Serif) is not recommended.*

- **Height** - The font height in inches (in the actual drawing sizes). **1 inch = 2.54cm**.
*If the **Scalable** box is not checked, then the height has only relative sense.*
- **Style** - Bold, Italic, Underline, Strike out
- **Screen color** - font color on the screen
- **Print Color** - font color at printing.
- **Scalable** -
 - If the **box is checked**, then the font size will change together with changing the drawing scale. The text typed in such font can be rotated to any angle. The box should be checked for the majority of fonts.
 - If the box **is not checked**, the font size will not change at changing the drawing scale, and at rotating text typed in such font it will be always horizontal. Such fonts are used for the **camera names** and **titles**. They prove to be convenient for creating labels to be read at any scale.

Right side of the tab

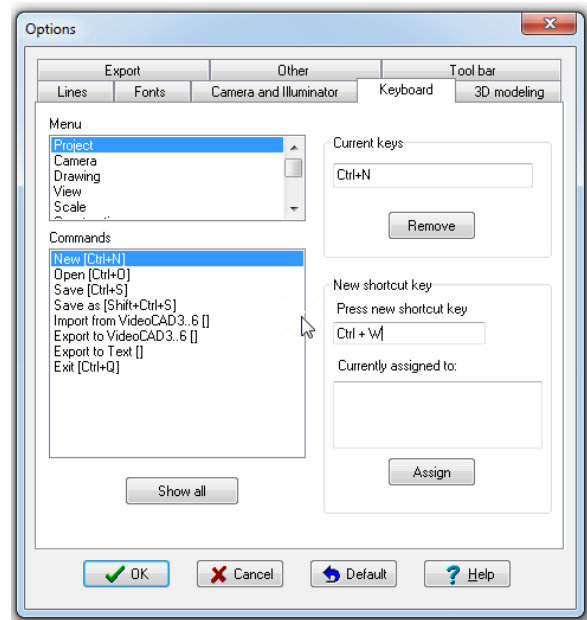
In the **tab right part** you can see and change numbers of **system fonts**:

- Font of the **titles** displaying;
- Font of the **titles** displaying in 3D window;
- Font of the **camera name** displaying.

It is not recommended to use the system fonts and change their parameters without necessary. Sometimes it leads to confusion.

7.6.3 Keyboard

Graphics window
Main menu
View
Options
Keyboard



On the tab you can assign **Shortcuts keys (keyboard shortcuts)** for the items of the [Main menu](#)^[105] of the Graphics window.

Keyboard shortcuts allow fast activation of various commands from the Main menu, by pressing shortcuts on the keyboard.

The order of shortcuts assignment to item of the Main menu:

In the **Menu** box choose section of the [Main menu](#)^[105].

*In the **Commands** box the list of items of the chosen section will appear. Already assigned shortcuts are indicated in brackets after the names of menu item.*

*By the **Show all** button it is possible to call the full list of all menu items with assigned shortcuts. This list can be saved to text file.*

In the **Commands** box select the name of the menu item.

If the menu item has already assigned shortcut, the shortcuts will be displayed in the box on the **Current keys** panel.

*To remove assigned shortcuts click **Remove**.*

To assign new shortcuts:

- Set input focus on the **Press new shortcut key** box on the **New shortcut key** panel.
- Press shortcut key on the keyboard.

*The pressed shortcuts will appear in the **Press new shortcuts** box.*

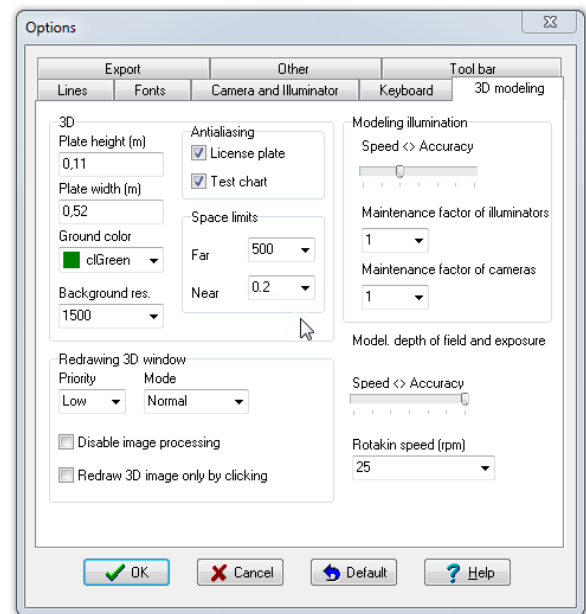
*If pressed shortcuts has been already assigned to other menu item, the name of this item will be displayed in the **Currently assigned to** box.*

- To assign typed shortcuts click **Assign**.

*Shortcut assignment will be removed from the item displayed in the **Currently assigned to** box*

7.6.4 3D modeling

Graphics window
Main menu
View
Options
3D modeling



3D panel

Plate height

- vertical size of the license plate in the 3D window.

Plate width

- horizontal size of the license plate in the 3D window.

Specify in these boxes the sizes of license plate, accepted in you country.

*Also create ***.bmp** file with the image of you license plate, name it **Number.bmp** and replace with it the file of the same name in the folder **Models** in the VideoCAD installation directory.*

!! The size of file sides, in pixels, must be equal to powers of two:

16,32,64,128,256,512,1024,2048

After that [3D models](#)^[128] - cars will be displayed with your license plate.

Ground color

- ground color in the 3D window.

Licence plate and test chart antialiasing

If these boxes are checked- the license plate and test chart are displayed more realistic in the 3D window, but at that it takes more time for repainting the 3D window and there can be errors on some outdated graphic card.

Space limits

At the use of some **outdated graphic card** the occurrence of distortions on the image in the **3D window** is possible. For reduction of the distortions it is recommended to reduce **Model space**.

*The increase of the **near space limit** has the much greater influence on distortions, than reduction of the **far space limit**.*

The objects which are closer to the camera, than **near space limit** or farther than **far space limit** will not be displayed, but the distortions of the objects which are **between space limits** will be

reduced or removed completely.

Background res.

In this box you can set resolution of vector background in the [3D window](#)^[173].

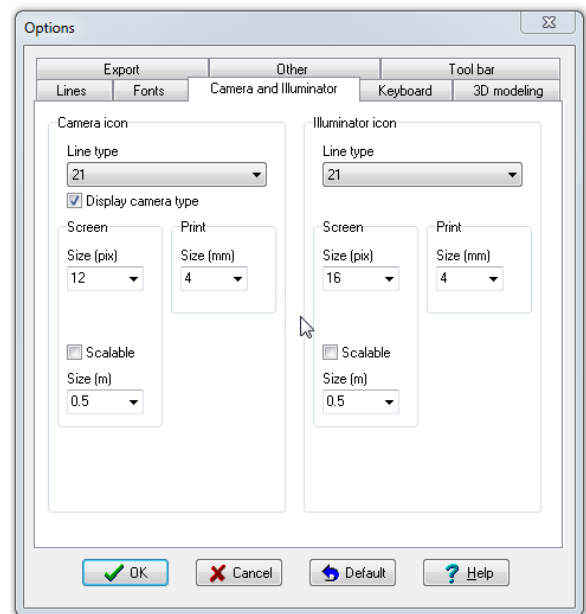
Redraw 3D image only by clicking

Modeling complex 3D scenes, especially taking into account illumination, require high computer performance.

If the image in the 3D window is redrawn too slowly and that hinder operation in the Graphics window, mark this box. After that the image in the 3D window will be redrawn automatically only at activation of cameras. To force redrawing click on the image.

7.6.5 Camera icon

Graphics window
Main menu
View
Options
Camera icon



On this tab can be changed:

Size and line type for icons of camera

The icon size is specified separately when displaying on the screen and when printing.

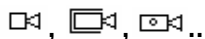
You can set any [line type](#)^[186] for a camera during [creating the camera](#)^[81].

The camera will be drawn by default line type, if another line type has not been specified during creation and placing.

Later on, you can change line type using [Change line type](#)^[136] tool.

Show camera type

If the box is marked, then cameras of different [types](#)^[81] will be represented by different icons:



In this case, camera tilt is not represented by the icons.

If the box is not marked, then all cameras will be represented by identical icons, which represent the camera tilt.

Scalable

If **Scalable** box is checked, then cameras' icons are scaled with the other constructions. Size of icons is specified in meters (feet) in the Size box below.

If **Scalable** box is not checked, then cameras' icons are not scaled. Size of icons is specified separately: on the screen in pixel - in the **Size (pix)** box, for printing in millimeters, - in the **Size (mm)** box.

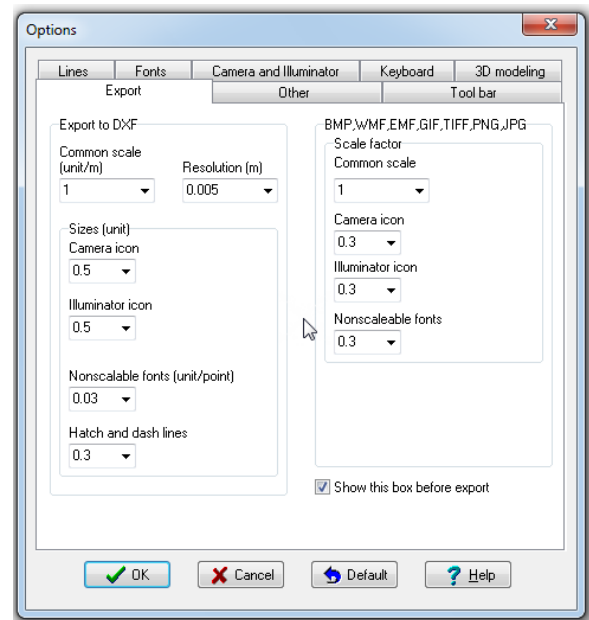
Size

Size of scalable icons in meter (foot), when the **Scalable** box is checked.

See also: [Move active camera name](#)^[110]

7.6.6 Export

Graphics window
Main menu
View
Options
Export



On the tab you can adjust parameters of [drawing export](#)^[110] to *.dxf, *.emf, *.wmf, *.bmp formats.

The tab is divided to 2 panels:

- Parameters on the [Export to DXF](#)^[195] panel are related to the export to AutoCAD™ format.
- Parameters on the [Export to BMP,WMF,EMF,GIF,TIF,PNG,JPG](#)^[196] panel are related to the export to raster BMP, GIF, TIF, PNG, JPG. formats and windows metafile vector formats (WMF, EMF) .

If the **Show this box before export** is marked, the Export tab will be shown before each export.

Export to DXF

Common scale (unit/m, unit/ft.)

Common scale of exporting drawing. The scale can be set in **AutoCAD unit per meter (or foot)** on the VideoCAD layout.

Resolution (m. or ft.)

Resolution is the accuracy of export. Objects having sizes smaller than the set resolution could be exported with errors. In most cases the resolution of 0.005m (0.5 cm) is optimal. For big size drawings (kilometers) the export with such resolution can lead to errors. In this case, it is needed to increase resolution and repeat export.

Sizes (unit)

As the export is usually executed with resolution, different from the screen resolution, it is necessary to adjust the size of nonscalable objects. In case of nonscalable objects become too small or too big in the exporting file.

Sizes (unit)

Camera icon (unit)

In the boxes you can specify sizes of camera **nonscalable** icons in AutoCAD units.

See also: [Scale](#)^[194]

Sizes (unit)

Nonscalable fonts, Hatch and dash lines

In the boxes you can specify scale factors for Nonscalable fonts, Hatch and dash lines.

Export to BMP,WMF,EMF,GIF,TIF,PNG,JPG

Scale factor

Unlike **Export to DXF**, the scale is not related to drawing size (in meter or foot), it is related to screen size only.

Common scale

Common scale of exporting drawing relatively layout size on the screen.

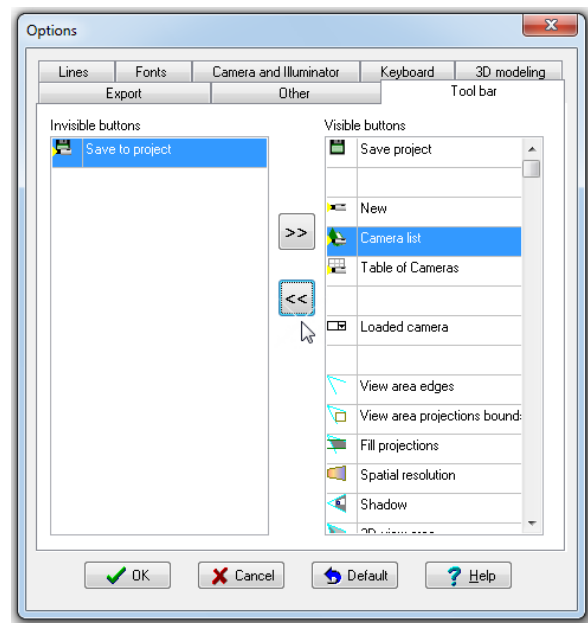
Camera icon, Nonscaleable fonts.

In the boxes you can specify scale factors of **nonscalable** Camera icon, Nonscaleable fonts.

See also: [Scale](#)^[194]

7.6.7 Tool bar

Graphics window
Main menu
View
Options
Tool bar



On this tab you can control visibility of buttons on the [Tool bar](#) of the Graphics window. In the left window there are **Invisible buttons**, in the right window there are **Visible buttons**.

With the help of buttons and you can move buttons between these two windows making them visible or invisible.

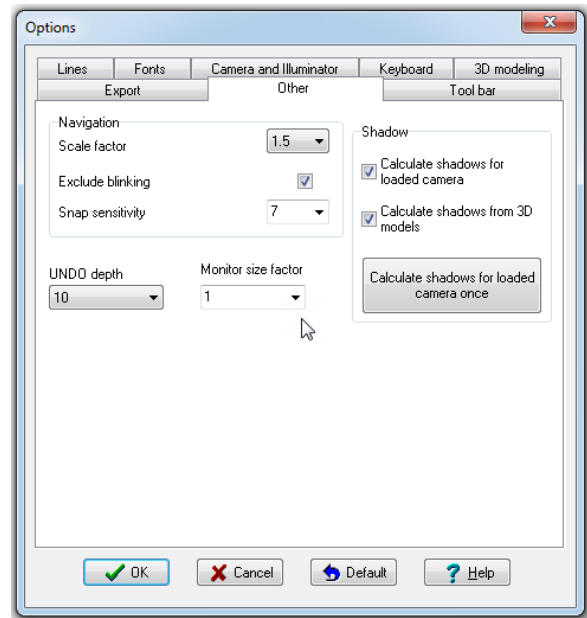
To move a button to other window:

- select it by clicking;
- click on the appropriate button **Make the button visible** or **Make the button invisible**.

If after changing buttons' visibility the Tool bar looks incorrectly, - restart VideoCAD.

7.6.8 Miscellaneous

Graphics window
Main menu
View
Options
Miscellaneous



Scaling factor when turning the mouse wheel

At a large factor the navigation becomes quicker, but less precise. Also use the key [Ctrl](#) ^[148]. Sign of this factor determines the reaction for direction of rotation the mouse wheel.

Exclude blinking

If the box is checked, then the redrawing is carried out in the computer memory and displayed on the screen only at the end. At that there is no image blinking, but the redrawing speed lowers slightly. If the box is not checked, the redrawing is carried out directly on the screen.

Snap sensitivity

You can adjust a distance on which the cursor will be snapped to points, lines and grid as a result of [snap](#) ^[131] effect.

Lesser sensitivity allows to control mouse more precisely.

Higher sensitivity allows to use some imprecise pointer devices or work with high resolution monitors.

UNDO depth

VideoCAD keeps several previous states for the possibility to undo operations using the [Undo](#) ^[104] function.

The number of keeping states can be adjusted in this box. The more states are kept and the more the project size, the more RAM is needed.

Monitor size factor

Correction factor to bring the physical size of the [Monitor window](#) ^[175] on the computer screen to the value specified in the [Monitor diagonal](#) ^[177] box on the **Tool bar** of the **Monitor window**.

To set the factor:

- open the **Monitor window**;

- specify in the [Monitor diagonal](#)  box on the **Tool bar** of the **Monitor window** approximately a half of the physical diagonal of your computer screen. The **Monitor window** must be visible on the screen as a whole;
- measure by a ruler the physical diagonal of the **Monitor window** on the computer screen;
- calculate the needed **Monitor size factor** = (value in the **Monitor diagonal box**) / (**Physical diagonal of the Monitor window**).

The Monitor diagonal is measured in inches. 1 inch = 25.4 mm.

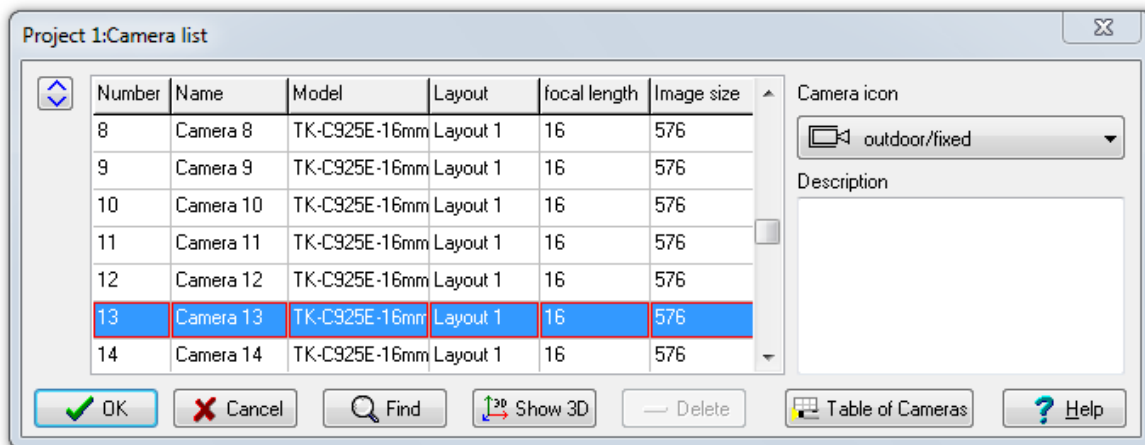
For various physical monitors and screen settings in Windows may require different Monitor size factors.

7.7 Camera list

Graphics window

Tool bar

 Camera list



In the **Camera list box** list of cameras in the project is displayed. **Active camera** is highlighted by **red frame**. Any camera can be activated, removed, renamed, found on layouts, it is possible to show 3D image from this camera. It is also possible to sort cameras in the list.

To perform any manipulations with the camera first select its name in the list by clicking.

For the chosen camera, it is possible to change **Additional information** and **Camera type**, which determines **camera icon type**.

Cameras are displayed by different icons, only if the [Display camera type](#)^[194] box in the [Options box](#)^[185] is marked.

To activate camera without closing the box, double click the row with camera name in the table.

It is convenient to activate any camera by double clicking on its lens on the layout or by camera's selection in the [Active camera](#)^[82] list on the **Tool bar** of the Graphics window. It is possible to activate cameras from the [Monitor window](#)^[181].

To find a camera on layouts select it in the table by clicking it once and then click **Find on layouts**. To show **3D image** from a camera select it in the table by clicking it once and then click **Show 3D**.

Choosing the items of **pop-up menu**, which appears when clicking the camera selected in the table with the right mouse button, can perform the same actions.

Using the pop-up menu it is also possible to **rename the camera**.

Choosing the item **Copy to clipboard** you can copy whole camera list to Windows' clipboard. After copying you can paste the camera list to **MS Word**, **MS Excel** or other software.

You can rename the camera and rename any number of cameras simultaneously using the [Numerate cameras](#)^[202] dialog box.

To sort the cameras in the list click the **Sort cameras**  buttons. Then will appear the buttons, by using which it is possible to move the cameras selected in the list upwards on one position, downwards, to the beginning or to the end of the list.

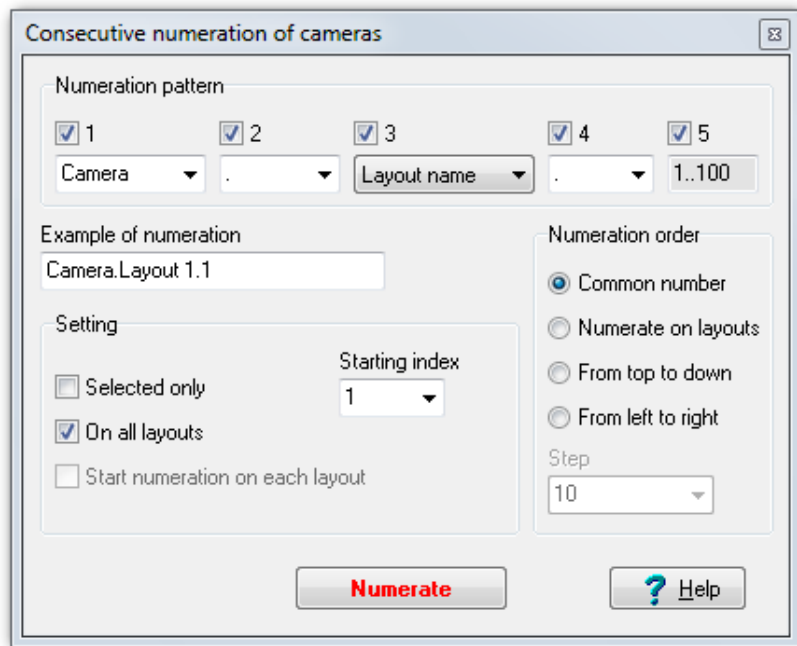
It is not recommended to change the order of cameras without necessity.

- To activate a camera and save the introduced changes click **OK**.
- To cancel the introduced changes and camera activation click **Cancel**.
- To switch promptly between cameras in the **graphics window** use the shortcut **Ctrl+Spacebar**.

See also: [Active camera combo box](#)^[82]

7.8 Numerate cameras

Graphics window
Main menu
Camera
Numerate
cameras



This tool allows renaming and serial numeration any quantity of cameras simultaneously.

Order of work:

1. Adjust [Numeration pattern](#)^[202].
2. Adjust [Numeration order](#)^[202].
3. Adjust additional [Setting](#)^[203].
4. Click [Numerate](#)^[203].

Numeration pattern

Numeration pattern can be adjusted by combo boxes and check boxes placed above the combo boxes.

In order that position of a combo box presents in the pattern, the box above this combo box should be marked.

It is possible to select variants of using the positions.

In the [Example of numeration](#) box the camera name example according to the specified pattern is displayed.

Numeration order

Camera numeration order on layouts is adjusted on the panel.

Common number - numerate in camera number increasing order all over the project. Camera numbers are displayed in the [Camera list](#)^[200] box in the **Number** column.

Numerate on layouts - numerate in camera number increasing order separately on each [layout](#)^[141].

From top to down - numerate cameras from top to down according to their position on layouts.

From left to right - numerate cameras from left to right according to their position on layouts.

Step - numeration step on layouts when numerating from top to down and from left to right (meters or fouts).

Setting

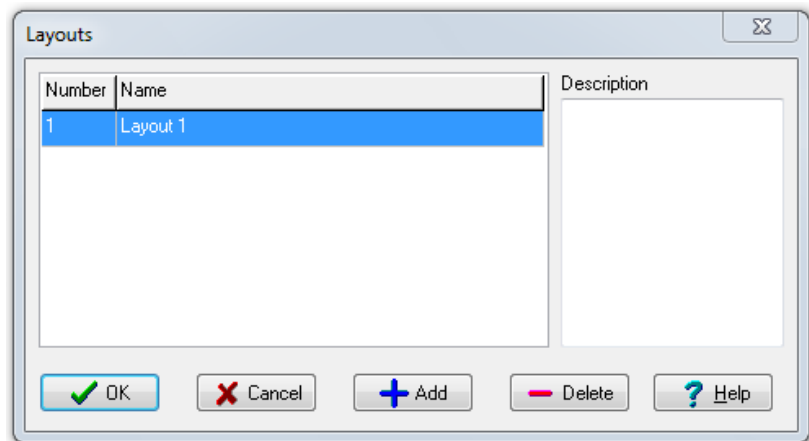
- **Selected only** - if the box is marked, numerate only [selected](#)  cameras, otherwise all cameras.
- **On all layouts** - if the box is marked, numerate cameras on all layouts in the project, otherwise only on the current layout.
- **Start numeration on each layout** - on each layout the numeration will be started over again. At that on different layouts in the project, cameras with identical names could be found.
- **Starting index** - index, from which to start numeration.

Numerate

- start numeration.

7.9 Layouts

Graphics window
Main menu
Drawing
Layouts



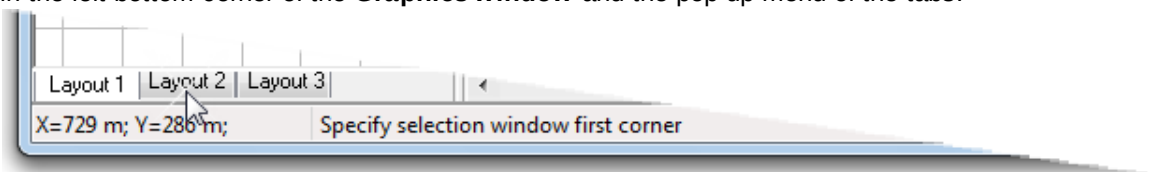
In this box a list of project **layouts** is displayed.

The project may contain up to **10** layouts. Originally one layout is created into project. You can create, delete or rename any project **layout**. To delete the **original layout** and any layout with the cameras present in it is not allowed.

The layouts are separate sections of monitored object (building, room, territory and storey). A layout contains the horizontal and vertical projections locating backgrounds, **cameras**, [cables](#)^[137] and [constructions](#)^[90]. Each camera can be displayed in one **layout** only, though the camera **cables** may pass through several layouts.

- To **choose** a **layout** for displaying it in the [graphics window](#)^[74] and saving the introduced changes select it in the table by clicking it once and then click **OK**.
- To **delete** a layout select it in the table by clicking it once and then click **Delete**.
- To **create** new layout click **Add**.
- To **rename** a layout double-click a line with its name in the table.
- To **cancel** the introduced changes and layout loading click **Cancel**.

It is convenience to switch the layouts, create, delete, rename the layouts using the [Layout](#)^[141] tabs in the left bottom corner of the **Graphics window** and the pop-up menu of the tabs.



To switch promptly between layouts in the **graphics window** use the shortcut **Ctrl+TAB**.

7.10 Signal cable length calculation box

Graphics window
Main menu
Cables
Signal cable

Cable brand	Twisted pair
Total length of all segments in layouts (m)	0
Reserve for cable laying (%)	10
Reserve for camera connection (m)	2
Reserve for receiver connection (m)	2
Cable length including reserves (m)	4
Cable coil size (m)	250
Cable coil number	1
Cable surplus (m)	246

Buttons: OK, Cancel, Help

VideoCAD summarises the lengths of all the **segments**, considers the **reserves** and calculates the **total length of cable**.

To change the default parameters and obtain the calculation results double-click on any **cable segment** or click [Signal cable](#)^[101] again.

A dialog box of the same name appears after that.

Cable brand

In this box you can assign a **brand** to the **signal cable of the active camera**. Cable brands are **Names** of [line types](#)^[186], which are considered as cables (the **Cable** box in the [line type parameters](#)^[186] is checked).. Thus we assign simultaneously cable brand and correspondent **line type** by which the cable will be drawn on layouts.

We can obtain [Cable report](#)^[139] which contains cable lengths of each brand separately.

The results of the cables' calculation on each individual camera and on the project as a whole are included into the text file obtained by [Export to Text](#)^[107]

See also: [Power cable electrical parameters and length calculation box](#)^[206], [View>Active camera cables](#)^[117], [View>All cameras' cables](#)^[117], [Length calculation of line segments](#)^[203], [Cable report](#)^[139]

7.11 Power cable electrical parameters and length calculation box

Graphics window
Main menu
Cables
Power cable

VideoCAD summarizes the lengths of all the **segments**, considers the **reserves** and calculates the **total length of cable**.

To change the default parameters and obtain the calculation results double-click on any **cable segment** or click [Power cable](#)^[102] again.

A dialog box of the same name appears after that enabling to choose a **section area of power cable** to fit the requirements of **camera voltage supply**.

It is assumed that the conductor material is copper and the conductor temperature is + 50° C

Cable brand

In this box you can assign a **brand** to the **power cable of the active camera**. Cable brands are **Names** of [line types](#)^[186], which are considered as cables (the **Cable** box in the [line type parameters](#)^[186] is checked).. Thus we assign simultaneously cable brand and correspondent **line type** by which the cable will be drawn on layouts.

We can obtain [Cable report](#)^[139] which contains cable lengths of each brand separately.

The results of the cables' calculation on each individual camera, each individual section area and on the project as a whole are included into the text file obtained by [Export to Text](#)^[107].

See also: [Signal cable length calculation box](#)^[205], [View>Active camera cables](#)^[117], [View>All cameras' cables](#)^[117], [Length calculation of line segments](#)^[208], [Cable report](#)^[139]

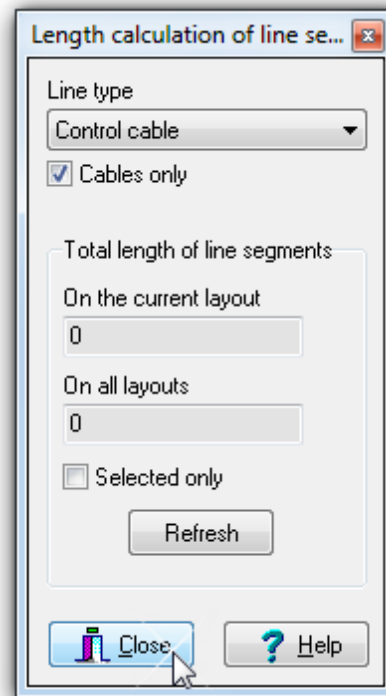
7.12 Length calculation of line segments

Graphics window

Main menu

Cables

Length calculation of line segments



With this tool it is possible to calculate total length of [line segments](#)^[92] of the chosen [line type](#)^[186]. Thus, it is possible to use certain **line types** as **cables**.

Only [line segment](#)^[92] lengths are summarized. Lengths of other type [constructions](#)^[90] are not summarized.

Line type

In the combo box you can select [line type](#)^[186]. Line segments made by the line type will be summarized.

Cables only

When this box is checked, in the **Line type** combo box only line types which are considered as cables are shown (the **Cable** box in the [line type parameters](#)^[186] is checked).

Selected only

Summarize [selected](#)^[77] segments only.

After selecting **line type**, in the **On the current layout** and **On all layouts** boxes calculation results will appear.

Additional buttons:

Refresh - Recalculate.

Close - Close the box.

Help - open this Help topic.

See also: [Cables](#)^[137], [Signal cable length calculation box](#)^[205], [Power cable electrical parameters and length calculation box](#)^[206], [Cable report](#)^[139]

Part



Examples of work with VideoCAD

8 Examples of work with VideoCAD

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8.1 Example 1 Choice of camera installation height and parameters

Problem

We have a number of objects spread in a space.

The objects have certain locations and sizes.

It is required to determine the **height of installation** and **lens focal length of the camera** to display all the objects properly.

Solution

1. Place the objects in **horizontal** and **vertical** projections according to their actual sizes and location using the [Rectangle](#)^[93]  tool on the [Tool bar](#)^[80].

*It is necessary for **3D modelling** to place objects only in the **horizontal projection**, color of the objects preset in the [line type](#)^[186], by means of which the object is drawn. **Heights of the objects** can be specified on the [Current construction parameter panel](#)^[146] during drawing constructions.*

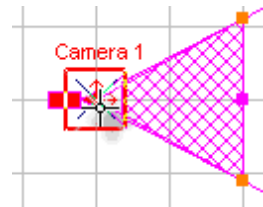
*As the objects prepared [3D models](#)^[128]  can be used (people, cars). Choose necessary 3D model from the **Tool bar** then specify by clicking the place of the model on layout.*

2. Open [3D window](#)^[86] . Control image in the 3D window during next operations.

3. Switch to [Select/Edit](#)^[87]  mode by successive pressing **ESC** key.

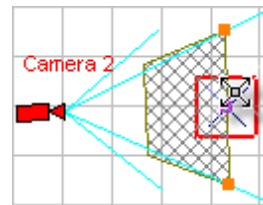
4. To move the camera:

- Select the camera by clicking on its lens;
- Move the cursor to the lens, then press the left mouse button;
- Keeping mouse button pressed, move the selected camera to a new place;
- Release the left mouse button.

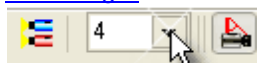


5. For tilting and panning the [Active camera](#)^[78] on the layout in [Select /edit](#)^[87] mode:

- Move the cursor to the pink grip in the middle of the view area bound. Thereupon, the point will be outlined by red square;
- Click on it by mouse;
- Move the cursor;
- To stop tilting or panning click once again on a point where the middle of the view area bound is to be located.

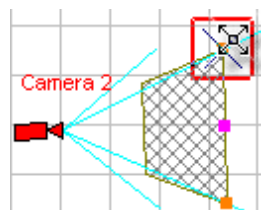


Current focal length value is displayed in the [Lens focal length](#)^[85] combo box on the [Tool bar](#)^[80].



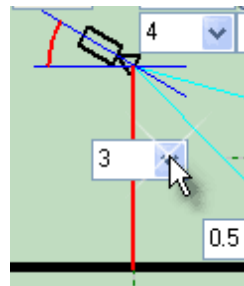
6. To change [lens focal length](#)^[153] of the active camera on the layout in [Select /edit](#)^[87] mode:

- Move the cursor to any orange grip on the ends of view area bound. Thereupon, the point will be outlined by red square;
- Click on it by mouse;
- Move the cursor;
- To stop changing focal length click Once again on a point where the end of view area bound is to be located.



7. You can change **Camera installation height** by choosing value from the [combo box](#)^[154] in the [Camera Geometry](#)^[85] box .

You can also specify the height by clicking in vertical projection after choosing the [Change installation height](#)^[103] tool.



8. According to **the image in the 3D window** and **view area projections** on the layout choose the optimal camera position and its [lens focal length](#)^[85].

External link: [The principles of CCTV design in VideoCAD. Part I. Camera view area \(*.pdf\)](#).

8.2 Example 2 Choice of cameras' quantity and location

Problem

- It is required to monitor a room of arbitrary form and sizes.
- **Person detection** is required at all the space of a room.
- **Person identification** is required beside an entrance door, a safe and a manager's table.
- The manager's workplace itself must not hit in the view area.
- Cameras might be installed anywhere, though not lower than **2.5 m**.
- It is required to choose the **camera quantity, lenses, locations and cables**.

Solution

1. [Create project](#)^[107]  and [Camera](#)^[108] .

2. Using the tools of [Constructions group](#)^[90] create an **actual plan** of a room.
All the details are not to be kept, our task is to observe the sizes carefully.

It is possible to load as a [background](#)^[111] prepared drawing in any of the following formats:

- *.bmp - a bitmap (e.g., the layout scanned from a paper copy);
- *.dxf - AutoCAD format (created in AutoCAD or other program supporting export to *.dxf);
- *.dwg - AutoCAD format (created in AutoCAD or other program supporting export to *.dwg);
- *.jpg - the compressed image (e.g., a digital picture of the plan);
- *.wmf, *.emf - Windows Metafile (export to *.wmf is supported by the majority of the Windows graphics applications)

*It is necessary for **3D modelling** to place objects only in the **horizontal projection**. **Color of the objects** is specified in the [line type](#)^[186], by means of which the object is drawn.*

***Heights of the objects** can be specified on the [Current construction parameter panel](#)^[146] during drawing constructions.*

*For example to model a **grey wall** it is necessary to use lines with the **minimum height 0 m** and **maximum - 3 m (the height of the wall)**; to model a door draw a rectangle using a **line with the heights 0-2 m**; to model a table surface draw a rectangle in the **height range 0,73-0,75 m** etc.*

Windows and door apertures can be cut through walls made by the [Wall](#)^[95] tool with the help of the [Aperture in Wall](#)^[96] tool. Or model walls by several constructions: under aperture, on each side of aperture, above aperture.

*It is possible to put **3D models** ^[128]  of people in some places.*

3. Create the essential quantity of cameras, using the [copying](#)^[89]  and [paste](#)^[89] .

4. By changing camera disposition in the **graphics window** and [lenses' focal lengths](#)^[85] we obtain the best location.

See. [Example 1](#)^[214].

5. In the [3D window](#)^[169] we can see 3D models of camera images.

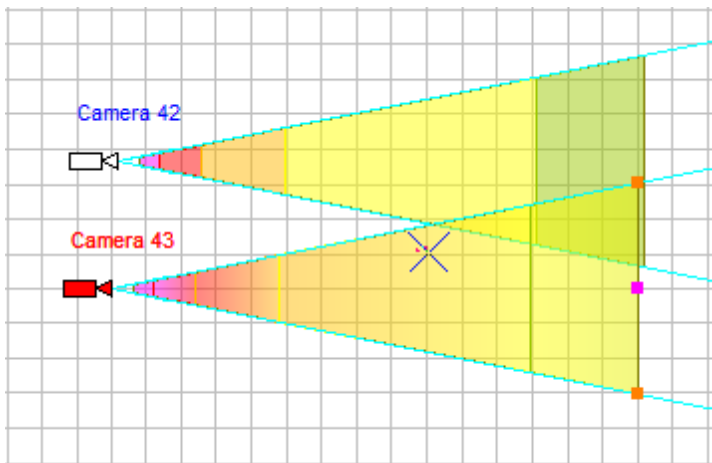
6. Choose **Filling**  in the drop-down menu of the [Fill projection](#)^[83] button on the **Tool bar**.

View area projection will be filled by blend color.

The color of filling is determined by the [line type](#)^[83] of the camera.

7. Choose **Discrete color**  in the drop-down menu of the  [Spatial resolution](#)^[85] button on the **Tool bar**.

*View area projection will be divided into the **regions**. The regions will be colored according to values of the [criterion](#)^[158] within the regions.*



8. Open the [Spatial resolution](#)^[85]  box.

In the [Pattern criterion](#)^[160] combo box you can see which criterion is chosen in the pattern assigned to the active camera.

Pattern criterion	Height	Object height
Pixel for object	AUTO	1,64

Specify vertical resolution (number of pixel) of camera in the [Vertical resolution of camera](#)^[162] combo box.

Vertical resolution of camera
576

In the [Table of regions](#)^[162] you can see what color corresponds to each range of the criterion value. On the images in the [Resolution](#)^[163] column, you can see with which resolution people at the far bound of each region will be visible.

On the images in the [Field of view](#)^[163] column, you can see which part of the **field of view** people at the far bound of each region will cover.

	Resolution	Field of View
Observe 164pix/obj		

9. Create additional layouts if needed (e.g. several storeys).

External link: [The principles of CCTV design in VideoCAD. Part 1. Camera view area \(*.pdf\)](#). [The principles of CCTV design in VideoCAD. Part 3. 3D modeling in VideoCAD" \(*.pdf\)](#).

8.3 Example 3 Choice of cameras' quantity and location on the original layout

Problem

There is a **location plan of site** in any of the following formats:

- *.bmp** - a bitmap (e.g., the layout scanned from a paper copy);
- *.dxf** - AutoCAD format (created in AutoCAD or other program supporting export to *.dxf);
- *.dwg** - AutoCAD format (created in AutoCAD or other program supporting export to *.dwg);
- *.jpg, *.gif, *.tif, *.png** - the compressed image (e.g., a digital picture of the plan);
- *.wmf, *.emf, *.emf+** - Windows Metafile (export to *.wmf is supported by the majority of the Windows graphics applications)

The length of a building frontal wall - **80m**. (Or any other size) is known.
It is required to **create a project of site surveillance system**.

Solution

1. Choose menu item **Drawing > Load background > Horizontal projection**^[111].
2. In the appeared dialog box choose a **layout file** and click **Open**.
3. In the appeared dialog box **Scale Background**^[111] click **Ruler**.
4. Click the beginning of the frontal wall in the loaded layout.
5. Then click on the end of the frontal wall.
6. After that enter the known length of the frontal wall - **80m** in the **Real distance** box.
7. Then click **OK** in the **Scale background** dialog box .
8. To obtain **3D model of the site**^[169], draw out lines on the background by **Constructions**^[90] in VideoCAD.
9. Further place cameras and cables on the original layout as well as in previous **Examples**^[213].

External link: [The principles of CCTV design in VideoCAD. Part I. Camera view area \(*.pdf\)](#)

8.4 Example 4 Calculation of camera view area parameters

Problem

It is required to calculate a horizontal projection of view area in a height range of **0.5-2 m** and projections of person detection and identification **areas** to a camera with **1/4" image sensor** and lens of **12-mm focal length**.

The camera is installed at **3,5-m height** above the ground. View area far bound is to be **10 m** away from the camera location.

The camera is designed to **detect a person**. It is required to determine **identification capacity**.

The lighting is adequate, camera resolution is high, and a digital system of high resolution is used for displaying and recording. Compression level is minimal.

The solution by calculating

Please see this Example in the VideoCAD 7 Professional Help system.

8.5 Example 5 Calculation of cameras' parameters and choice of their relative locations

Problem

It is required to monitor a wall of building at a level of ground floor windows.

- Wall length - **60 m**.
- Height of windowsills - **1 m**.
- Height of windows - **2 m**.

*The minimal height to install cameras under the requirements of vandalism guard - **3.5 m**.*

- **Person detection** by the digital **video motion detector** for the wall space is required. The **video motion detector** can detect an object with no less than **5x5** pixel size.
- An entrance is situated within a **20-m** distance from the wall edge. It is required to identify all people coming in and out of the building.
- A busy highway is situated within a **10-m** distance from the wall. It is required to minimise the highway hitting in the camera view areas.
- The lighting is adequate and at night luminaires are used.
- The high-resolution cameras are used, with **1/3"** image sensor, **752x582** effective pixels.
- A digital system of the high resolution with the full frame input is used for displaying and recording. Output image size is **768x576 pixels**.
- The compression level is minimal.
- The image is color.
- Real horizontal resolution is 350 TV lines

Solution

Please see this Example in the VideoCAD 7 Professional Help system.

8.6 Example 6 Determining person identification criteria by a real image

Please see this Example in the VideoCAD 7 Professional Help system.

8.7 Example 7 CCTV design using Monitor window and PTZH frame

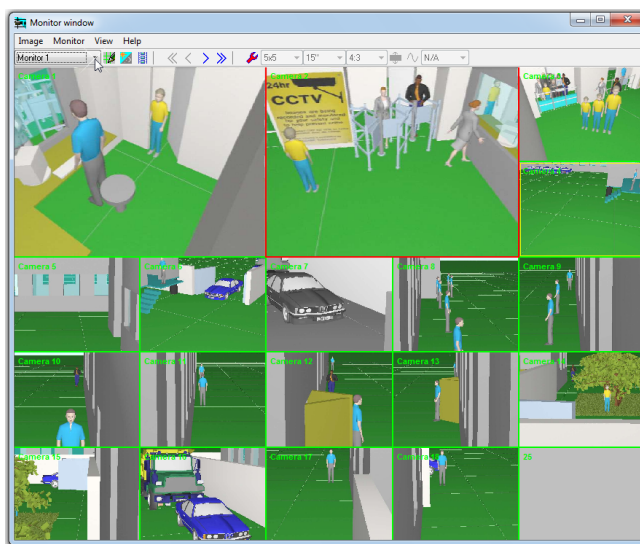
The [Monitor window](#)^[175] and the new tool in the [3D window](#)^[169] - [PTZH frame](#)^[172] allow to project video surveillance system by a new method, working directly with images from video cameras. This method can be very convenient.

Order of work:

1. [Create](#)^[107] the project, [load background](#)^[111], by means of [constructions](#)^[90] create **3D model of environment** and place [3D models](#)^[98] of people and cars at control points.

2. Preliminary place cameras in the **Graphics window**.

4. [Open](#)^[86] the **Monitor window**, choose [Dimension](#)^[177] of monitor. This dimension must be a little bit greater than quantity of cameras. [Connect](#)^[183] all cameras to this monitor. On the monitor images from preliminary placed cameras will be visible.



5. Analyze images. If an image is not optimum, do the following:

- Double click the image. **3D window** will appear.
- In the Main menu of **3D window** choose item [View> PTZH frame](#)^[172].
- Using the frame, adjust position and parameters of the camera to get optimum image. At the same time, changes in the **Graphics window** are performed automatically.



- Thus adjust all cameras. If necessary [move](#)^[89] cameras in the **Graphics window**, create additional cameras and delete the cameras, which have become unnecessary.
- If one monitor is not enough to control video surveillance system, connect cameras to [other](#)

[monitors](#)^[176] in the **Monitor window**.

6. As a result we receive ready project:

- Drawing of cameras' placement in the **Graphics window**;
- Images of video surveillance system on monitors;
- [Description](#)^[107] of all cameras for an explanatory note;

External link: ["The principles of CCTV design in VideoCAD. Part 3. 3D modeling in VideoCAD"\(*.pdf\)](#)

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8.8 Example 8 CCTV project

In the **Examples** directory you can find an example of a video surveillance system project of an administration building that **was designed in VideoCAD 7.0**.

In this project **locations and parameters**^[152] of cameras were chosen.

In the project a prepared [background](#)^[111] is used in the *.dxf format, walls and objects in the cameras view areas are outlined by VideoCAD constructions. There are [3D models](#)^[98] and [3D images](#)^[100] in the project.

You can look into each camera having activate it and opening [3D window](#)^[169] .

It is convenient to load camera by double clicking on its lens or by choosing in the [Active camera](#)^[82] combo box.

You can display all cameras on the Monitor, by clicking the [Monitor window](#)^[86]  button.

In the the **demo-version** you can not edit the cameras. When activation of any camera its [lens focal length](#)^[153] will become **4 mm**, [image sensor format](#)^[153] - **1/3"**.

In the **full version** you can edit the project and choose more suitable location and parameters of cameras.

External link: ["The principles of CCTV design in VideoCAD. Part 3. 3D modeling in VideoCAD"\(*.pdf\)](#)

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8.9 Example 9 Choice of camera model according to known scene illumination

Problem

There is a **black/white** mini camera with known sensitivity parameters: **Minimum scene illumination** 0.04 lx with lens **F1.2** at **signal/noise ratio**=10dB, **IRE30**.

Mini lens **F2.0** is mounted on the camera.

At night the scene is poorly illuminated by the illuminator with a **mercury high pressure lamp**, placed far from the scene. Illumination measured by the luxmeter is **0.1 lx**.

It is required to obtain and evaluate image model from the camera.

Solution

Please see this Example in the VideoCAD 7 Professional Help system.

8.10 Example 10 Measuring camera sensitivity

Problem

There is a camera. It is necessary to measure its sensitivity.

*The matter of measurement of sensitivity is a measurement of scene illumination with which the camera image have Signal/Noise ratio = 17dB. To measure illumination a Luxmeter is used, to measure Signal/Noise ratio the **Image analyzer** or the **Video analyzer** from the **CCTVCAD Lab Toolkit** package can be used.*

*The **Video analyzer** reads out the Signal/noise ratio directly from the screen.*

*The **Image analyzer** uses the stored frames in *.bmp or *.jpg formats.*

*In most cases the **Video analyzer** is more convenient for measuring signal/noise ratio.*

Equipment:

Please see this Example in the VideoCAD 7 Professional Help system.

8.11 Example 11 Measuring low illumination

Not expensive luxmeters which are presented on the market have the lower-range value about 0.1..0.5 lux, but minimum scene illumination for modern cameras reaches 0.04 lux. Therefore when [measuring sensitivity](#)^[226] of such cameras it is necessary to attenuate sensitivity in known number of times (it is convenient to attenuate in 50-200 times).

It is possible to attenuate sensitivity in the following ways:

- By limiting exposure time of electronic shutter;
- By calibrated manual iris lens;
- By calibrated attenuation filter.

Please see this Example in the VideoCAD 7 Professional Help system.

8.12 Example 12 Measuring resolution of camera (lens)

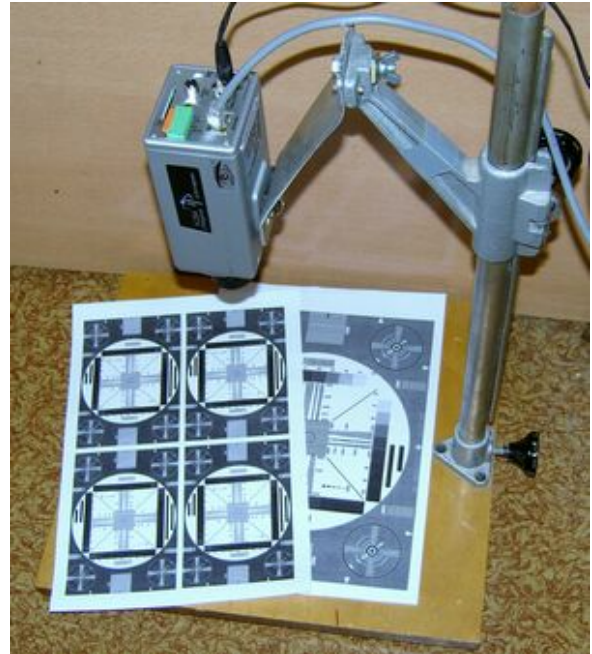
Problem

There is an image of the test chart EIA 1956, made by equipment under test (camera+lens+DVR). It is necessary to determine equipment resolution in TV lines at contrast loss of 10%.

To measure resolution of **megapixel cameras** (more than 800 TV lines) you can also use the test chart **EIA1956**, but it should not occupy the entire frame, but a part of the frame. For example, if the table will occupy by the area of a quarter of the frame (half the vertical and half of horizontal sizes), the range of measured values of resolution will be doubled and will be 400-1600 TV lines.

By making measurements with the same camera, but with different lenses, we can compare **resolution of the lenses**. Lens resolution is very important for **megapixel cameras**.

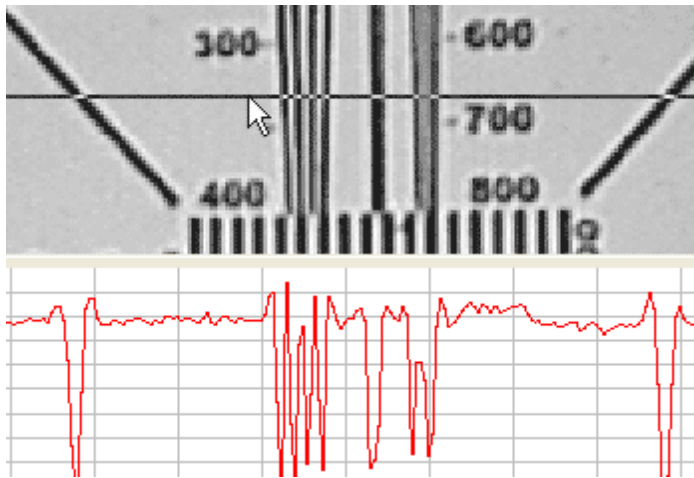
We can measure **resolution with a given drop of contrast** as well as **drop the contrast at a given resolution**.



To perform the measurements you need the software **CCTVCAD Lab Toolkit** (visit <http://cctvcad.com>).

Solution

1. Open the [Image analyzer](#)^[228] from **CCTVCAD Lab Toolkit**.
2. Click **Load** in the upper left corner of **Image analyzer** and select image file.
3. For conveniences it is recommended to increase image size in 2 times. To do this open the **Processing** tab, enter two times larger sizes on the **Image size** panel and click **Apply**.
4. Open the **TV lines** tab.
5. Click vertical wedge area of the test chart with lines corresponding to the minimal resolution (100-200TV lines). Record peak-to-peak amplitude of signal in the area of minimal resolution.
The peak-to-peak amplitude of signal can be seen on the oscillogram under the image.
6. Move the cursor with pressed mouse button to the side where the wedge becomes narrow up to the moment when the peak-to-peak amplitude of signal from the wedge makes 10% from the signal amplitude at minimal resolution.



7. Determine resolution according to the place of analyzing line on the test chart.

In case when resolution is close to the maximal possible one at specified image size and camera aperture corrector works, determining the point of the contrast loss of 10% could be difficult. Image pixel beating and chart lines beating as well as image digitization hinder from it. This problem refers equally to all ways of resolution measurement.

Using **CCTVCAD Lab Toolkit** we can measure resolution of separate colors.

8.13 Example 13 Measuring maximum scene illumination for a camera

Problem

There is a camera. It is required to measure maximum scene illumination, at which this camera produces image without brightness limitation.

Equipment:

- Luxmeter (a device for measuring illumination). Almost any kind of such a device with standard CIE spectral response will suit.
- Monitor.
- Projector with tungsten halogen lamp 220V, 1000W or more.

Such projector can create illumination up to 150000lx, what exceeds illumination in bright sunny day on mid-latitudes (100000-120000lx).

Work carefully with the projector. There is danger of overheating and inflammation of fire hazardous materials next to the projector.

- Lens with F1.2 aperture, parameters of which **are reliable**, focal length is 4-8mm.

If the camera allows to mount only mini-lenses (M12), the mini-lens with a known aperture (F2.0) is needed.

- A sheet of crumpled white paper.
- Stand. It is recommended for convenience and accuracy.



Order of work

1. Switch off all additional options of image processing. Only AESC and AGC should be switched on.

2. Mount lens F1.2, on the camera, mount the camera on stand, direct it towards sheet of paper, connect to computer, display image on the screen.

If the camera allows mounting only mini-lenses (M12), mount a mini-lens with known aperture (F2.0).

3. Reduce contrast of the monitor to 50-70% of maximum.

4. Close to the sensor window directly on the sensor, fix a small piece of crumpled white paper.

5. Switch ON the projector.

6. By changing the distance from the projector to the luxmeter sensor, obtain the image on the screen with a little bleeding whites on the bends of the rumpled sheet of paper.

You must not change the lamp supply voltage. It should be equal to nominal lamp supply voltage. Change Illumination only by means of distance variation between the lamp and the sheet of paper. Be sure, that the luxmeter sensor window and the small piece of paper on the sensor have visually equal illumination.

7. Record the maximum illumination according to the luxmeter reading.

Maximum illumination for black/white cameras with 1/3" CCD image sensor with exposure range of the electronic shutter up to 1/100000s and lens with the aperture F1.2 make approximately 20000..30000lx. It allows using these cameras indoor with any lenses or outdoor with auto iris lenses or lenses with maximal aperture no more than F2.5.

Maximum illumination for high-quality color cameras or day/night cameras exceeds 100000lx. For mini-cameras with image sensor format of 1/4" the maximum illumination can be considerably lower.

8.14 Example 14 Examples of luminaire calculation

Please see this Example in the VideoCAD 7 Professional Help system.

8.15 Example 15 Choice of luminaire power and location

Please see this Example in the VideoCAD 7 Professional Help system.

8.16 Example 16 Determining spectral efficiency of light source

Please see this Example in the VideoCAD 7 Professional Help system.

8.17 Example 17 Measuring projector parameters

Problem

There is a visible light projector with close to round symmetrical light intensity distribution. It is necessary to create the model of this projector in VideoCAD.

Equipment:

- Luxmeter (a device for measuring illumination). Almost any kind of such a device with standard CIE spectral response will suit.
- Measure by the luxmeter and write down the **projector illumination on an axis of radiation** at the distance not less than in 20 times more than the geometrical size of the radiant window.

Order of work

Please see this Example in the VideoCAD 7 Professional Help system.

8.18 Example 18 Measuring parameters of IR illuminator

Problem

There is an **IR illuminator**. It is necessary to measure efficiency of this illuminator for a black/white camera in relation to the halogen incandescent lamp and create model of this illuminator in VideoCAD.

Equipment:

To perform the measurements you need the software CCTVCAD Lab Toolkit (visit <http://cctvcad.com>).

- Luxmeter (a device for measuring illumination). Almost any kind of such a device with standard CIE spectral response will suit.
- Any PC-based video capture system, TV-tuner with video input, etc. The System should allow to display live video on the computer screen.
- **Video analyzer** utility. It is a part of [CCTVCAD Lab Toolkit](http://cctvcad.com)^[236].
- Compact tungsten halogen lamp 12V, 10W.
- Stabilized power supply unit for the lamp. 12V DC, without considerable ripples of output voltage.
- **Manual Iris Lens**, focal length is 4-8mm.
- Stand. It is recommended for convenience and accuracy.
- Measuring should be carried out in a dark room.

Order of work

Please see this Example in the VideoCAD 7 Professional Help system.

8.19 Example 19 Modeling megapixel images

Problem

Because of the **Open GL** limitation, we can not create three-dimensional image with a resolution in pixels more than the **screen resolution in Windows**. However, modern megapixel cameras already have a much higher resolution.

Even when the camera resolution is less than the screen resolution, it is inconvenient to work with images that occupy a large area on the screen and require a lot of time for regeneration.

In most cases, we need only to see how an object on the scene will look on image from a camera with the specified resolution.

VideoCAD solves this problem with the help of **PiP** technology (Picture in Picture).

Order of work

Please see this Example in the VideoCAD 7 Professional Help system.

8.20 Example 20 Selecting frame rate on the basis of known target's positions and velocities

The **frame rate** greatly affects the required bandwidth of communication channels, the capacity of the archives, computing power, and hence the total cost of video surveillance systems. At the same time, choosing optimal frame rate - not an easy task and criteria for selection are not always unambiguous. When the frame rate is too low, omission of important events are possible, too high frame rate leads to an unjustified rise in price of video surveillance systems.

VideoCAD offers a tool for choosing frame rates based on the **desired frequency of getting in the frame objects with the known positions and velocity**. Additionally, you can create **animated images with the specified frame rate**.

Problem

Place of camera installation, the probable locations and velocity of moving objects are known. We should choose an optimal frame rate to ensure that any moving object gets into the frame at least twice.

Order of work

Please see this Example in the VideoCAD 7 Professional Help system.

8.21 Example 21 Creating animated model of monitor

*This example shows how to create an animated model of monitor as *.html file. This model may contain up to 100 animated images from different cameras. Each image has its own settings (frame rate, resolution, etc.). Obtained html file can be viewed by any Internet browser, edited with any text editor, etc.*

[See an example of animated monitor \(file size about 4 Mb\).](#)

Order of work

Please see this Example in the VideoCAD 7 Professional Help system.

8.22 Example 22 Visualization of cameras' control area projections and spatial resolution inside them

Read before: [Spatial resolution](#)^[85] , [Spatial resolution box](#)^[158] 

Problem

We have a three-dimensional model of a complex environment.
We need to determine the areas controlled by cameras. Within the control areas, the **spatial resolution** of cameras must be visualized.

We should be able to estimate directly on the 2D site plan how people will look into the camera image at each point of the camera control area.

Order of work

1. Construct three-dimensional model of the environment using the tools of [3D modeling](#)^[90].

You can import the environment or its fragments in the form of one or several [3D models](#)^[98] imported from other graphics formats using [Autodesk 3ds Max or Google SketchUp](#)^[255].

2. Place a camera. Activate it.

3. Choose **Filling**  in the drop-down menu of the [Fill projection](#)^[83] button on the **Tool bar**.

View area projection will be filled by blend color.

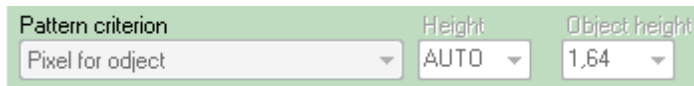
The color of filling is determined by the [line type](#)^[83] of the camera.

4. Choose **Discrete color** in the drop-down menu of the  [Spatial resolution](#)^[85] button on the **Tool bar**.

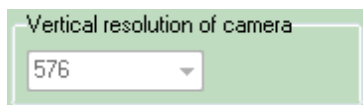
View area projection will be divided into the **regions**. The regions will be colored according to values of the [criterion](#)^[158] within the regions.

5. Open the [Spatial resolution](#)^[85]  box.

In the [Pattern criterion](#)^[160] combo box you can see which criterion is chosen in the pattern assigned to the active camera.

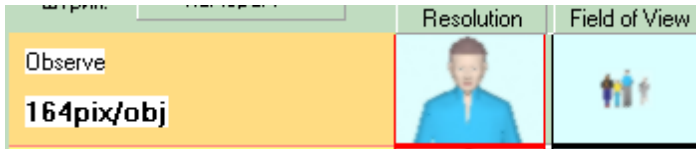


Specify vertical resolution (number of pixel) of camera in the [Vertical resolution of camera](#)^[162] combo box.



In the [Table of regions](#)^[162] you can see what color corresponds to each range of the criterion value. On the images in the [Resolution](#)^[163] column, you can see with which resolution people at the far bound of each region will be visible.

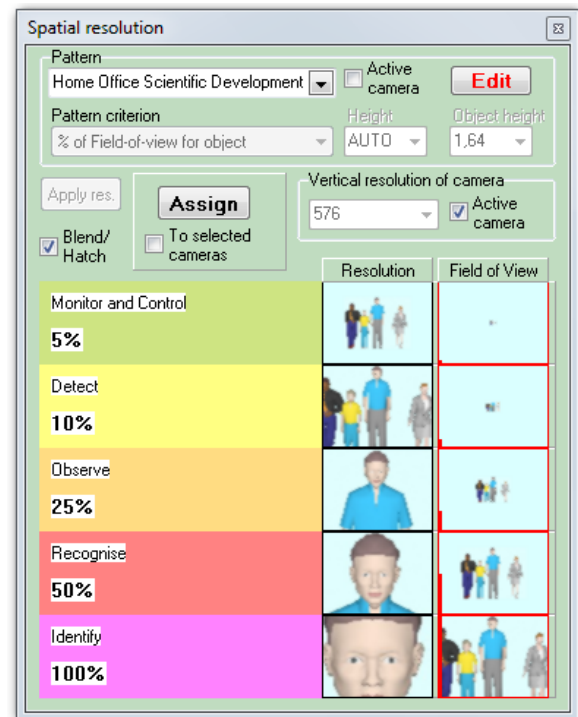
On the images in the [Field of view](#)^[163] column, you can see which part of the **field of view** people at the far bound of each region will cover.



See details: [Spatial resolution box](#)^[158].

7. Keep the Spatial resolution box opened.

It is convenient to keep the Spatial resolution box opened during the analysis of spatial resolution in the Graphics window. Comparing color of regions on the layout with colors in the [Table of regions](#)^[162] in the **Spatial resolution box**, on the images in the [Resolution](#)^[163] and [Field of view](#)^[163] columns you can immediately see the expected resolution and field of view size at every point of view area of each camera.



Please also see this Example in the VideoCAD 7 Professional Help system.

8.23 Example 23 Choosing install location for PTZ camera

Problem

We have a three-dimensional model of a complex environment. We should choose the best install location for PTZ (dome) camera so that the areas you want to monitor, should be not shaded by objects of the environment.

Order of work

Please see this Example in the VideoCAD 7 Professional Help system.

8.24 Example 24 Simulating distortions of moving objects arising from Exposure time, Interlace scan and Rolling shutter

Problem

There are three cameras:

- Three-megapixel (3MP) (2048x1536) IP camera with CMOS sensor and Rolling shutter;
- 1.3 megapixel (1280x960) IP camera with CCD sensor and Global shutter;
- 0.4MP (768x576) analog camera with interlace scan.

We know camera exposure time at the scene light conditions.

- 3MP IP Camera - 100ms;
- 1.2MP IP camera - 50ms;
- analog camera - 20ms (PAL).

3MP camera employs Rolling shutter, the period between start reading successive rows = 50 microseconds.

All cameras have the same sensor size $1/3''$ and a lens with a focal length = 4mm.

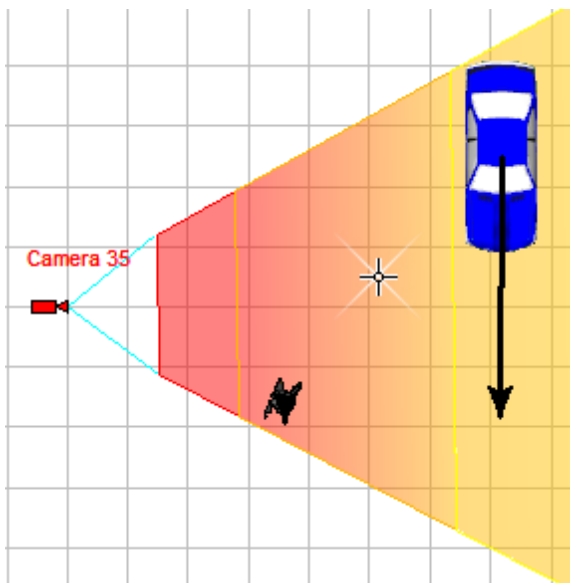
We know camera position, location and speed of moving objects on the scene.

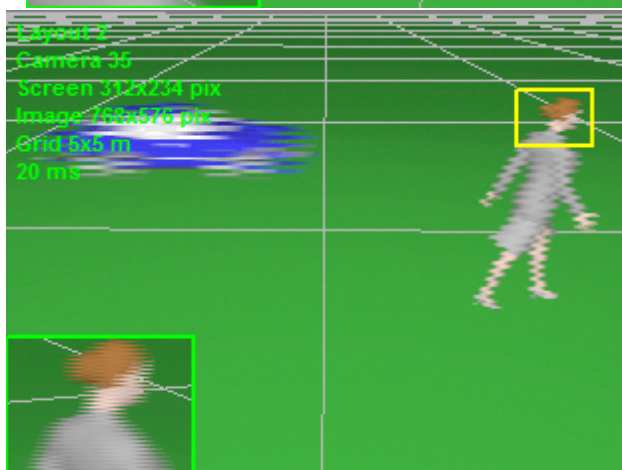
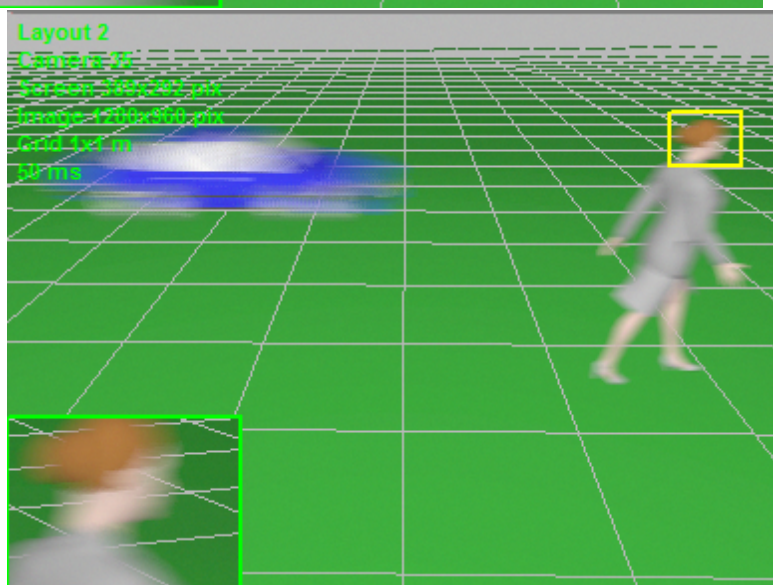
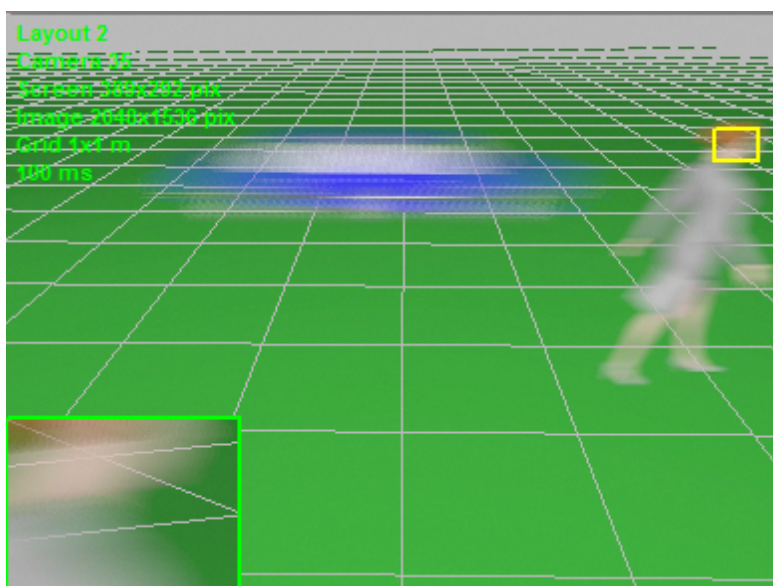
We need to get the model images of moving objects from each camera at the same position and compare them.

See also: [Measuring exposure time of IP camera](#)^[249], [Measuring rolling shutter row time of IP camera](#)^[252]

Order of work

Please see this Example in the VideoCAD 7 Professional Help system. Here are the obtained images below. In the frame there is a car moving at a speed of 20 m/s (72 km/h) and a woman moving at a speed of 2 m/s (7,2 km/h)/





See also: [Measuring exposure time of IP camera](#)^[249] [Measuring rolling shutter row time of IP camera](#)

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External link: ["The principles of CCTV design in VideoCAD. Part 5. Video surveillance of moving objects"\(*.pdf\)](#)

8.25 Example 25 Calculating lengths of cables and getting Cable report

Problem

There is a layout with the placed cameras. We need to determine the required cable length separately for each brand of cable.

Order of work

1. Configure a separate line type for each brand of cables used in the project

1.1 Open the [Options box](#)^[185], switch to [Lines](#)^[186] tab.

1.2 In the **Number** box, select any unused number of **line type**.

Do not select line types, used as [system lines](#)^[187].

1.3 In the **Name** box, type a name of a cable brand, which will correspond to the selected line type.

1.4 Check the [Cable](#)^[186] box.

1.5 When necessary, adjust the line **Style**, **Color** and **Width** on the screen and at printing.

1.6 To make lines of this type invisible on the **3D window**, set equal the **maximum** and **minimum** heights on the **3D** panel.

1.7 Repeat steps **1.2** .. **1.6** for all brands of cables used.

1.8 Click **OK** in the **Options box**.

2. Assign brands to cables of cameras

2.1 Activate any of cameras.

2.2 Assign brand to the signal cable

2.2.1 Click the menu item **Main menu>Cables>Signal cable>Calculate**.

2.2.2 In the appeared [Signal cable length calculation box](#)^[205] choose [Cable brand](#)^[205] from the adjusted at [p.1](#)^[246] line types.

2.2.3 When necessary, adjust reserve for cable laying and connection.

2.2.4 Click **OK** in the **Signal cable length calculation box**.

2.3 Assign brand to the power cable

2.3.1 Click the menu item **Main menu>Cables>Power cable>Calculate**.

2.3.2 In the appeared [Power cable electrical parameters and length calculation box](#)^[205] choose [Cable brand](#)^[205] from the adjusted at [p.1](#)^[246] line types.

2.3.3 When necessary, adjust reserve for cable laying and connection. Specify electrical parameters.

2.3.4 Click **OK** in the **Power cable electrical parameters and length calculation box**.

2.4 Repeat steps **2.1** .. **2.3** for all cameras, cables of which must be taken into account.

3. Draw cables of cameras in horizontal and vertical projection

3.1 Activate any of cameras.

3.2 Choose **Main menu>Signal cable**^[137] and draw the signal cable of this camera.

3.3 Choose **Main menu>Power cable**^[138] and draw the power cable of this camera. .

*When this item chosen, you can draw the **signal cable** of the **active camera** by successive clicks*

in the **graphics area**. The end of each segment is the start of the next one. To stop drawing cable, press **ESC**.

The [status bar](#)^[142] displays the segment length and its projection to distance and height.

Both clicks are to be made in the **same projection**. If the projections are different the measured values are incorrect, therefore when constructing a segment with its ends in different projections the values are not displayed in the **status bar**. In this case when changing the drawing the segment is attached to the projection with its **initial point**.

A cable consists of **segments**, allowing to draw it in different projections and layouts, representing an actual scheme of laying accurately.

When [copying](#)^[89] the **cable segments** between **cameras** and layouts a process of cable drawing is accelerated considerably even in complex CCTV systems.

When drawing a cable the menu item [Cable laying](#)^[138] might be used. When choosing it a float panel of the same name appears enabling to choose a shift of segment ends for a level parallel cable drawing along the walls, columns etc.

If the **Main menu>View>All cameras' cables**^[117] item is checked, **cables of all cameras** will be visible, but only **cables of the active camera** can be edited. If this item is not checked, **cables of the active camera** will be visible only.

4. Draw the Main cables (which is not associated with cameras)

4.1 Draw the **Main cables** with the help of tools [Line segment](#)^[92]  and [Polyline](#)^[92] , using the adjusted at [p.1](#)^[246] line types.

Line type can be assigned before drawing lines or during editing lines on the [Line type panel](#)^[144]. To change Line type of several [selected](#)^[87] lines at once, use the [Change line type](#)^[136] tool.

5. Get the Cable report

Choose Main menu>Cables>[Cable report](#)^[139]. The Cable report includes lengths of the cables attached to cameras and the **main cables** as well. Cable lengths is calculated for each brand (line type) separately.

See also: [Active camera's cables](#)^[117], [All cameras' cables](#)^[117], [Line segment](#)^[121], [Polyline](#)^[122], [Signal cable](#)^[137], [Power cable](#)^[138], [Cable laying](#)^[138], [Length calculation of line segments](#)^[138], [Cable report](#)^[139]

⌞

8.26 Example 26 Checking Depth of Field in horizontal projection

Problem

We need to check that a camera has enough Depth of Field.

Order of work

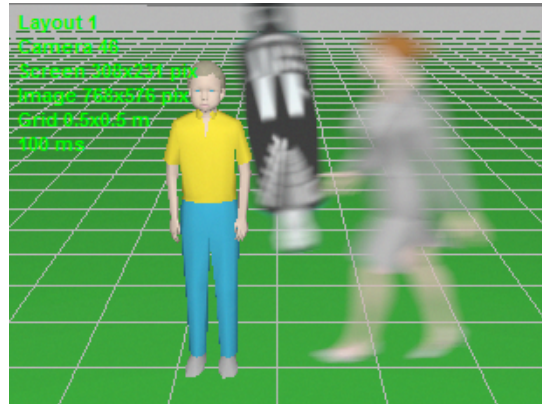
Please see this Example in the VideoCAD 7 Professional Help system.

8.27 Example 27 Measuring exposure time of IP camera

The sensitivity of cameras depends on the exposure time. Within the validity of the **Reciprocity principle**, the camera sensitivity is **directly proportional to the exposure time**.

However, increasing exposure time leads to blurring of moving objects that is often unexpected. Usually, when measuring sensitivity of cameras and while accepting built CCTV system a customer looks only at static images, but moving targets are of interest.

The greater the exposure time and the greater the velocity of an object on the screen, the more the blur.



Automation of camera (AESC) constantly adjusts the exposure time (shutter speed) depending on the illumination on the image sensor. The more light is, the less exposure time is set. But from a certain threshold light AESC sets the maximum exposure time and further reducing light doesn't increase the exposure time. Knowing the maximum exposure time and the threshold illumination is very useful in designing CCTV systems.

VideoCAD7 offers a tool for modeling blur of moving objects in dependence of the exposure time. But to use this tool, you need to know the exposure time.

Knowing the maximum exposure time is also needed correct interpretation of results of measuring sensitivity and sensitivity values in the camera specification. With a minimum illumination the camera sets the maximum exposure time. Unless otherwise indicated, the sensitivity value in the camera specification can be achieved at the maximum exposure time.

The maximum exposure time of standard analog cameras without light accumulation is 20ms for PAL and 16,5 ms for NTSC. IP cameras and analog cameras with accumulation of light can use exposure time up to 200ms and more. With latent increasing the maximum exposure time, many manufacturers increase the certified sensitivity of their cameras.

Many cameras allow to modify the maximum exposure time, switching the "night", "supersensitive" modes, etc. But these settings don't report the real value of the exposure time. If the camera has several "night" modes, for their proper use it is necessary to know the maximum exposure time for each of them.

Problem

There is a camera. It is necessary to measure its **maximum exposure time** and the **threshold illumination** at which the camera switches to the **maximum exposure time**.

Equipment:

- Oscilloscope. Any analog oscilloscope will suit.
- Luxmeter (a device for measuring illumination). Almost any kind of such a device with standard CIE spectral response will suit.

- In case of testing analog cameras, we need any PC-based video capture system, TV-tuner with video input, etc. The System should allow to display live video on the computer screen and separate frames. *For testing IP cameras it is enough to have possibility to display video on the screen and separate frames.*
- Compact tungsten halogen lamp 12V, 10W.
- Stabilized power supply unit for the lamp. 12V DC, without considerable ripples of output voltage.
- Lens with F1.2 aperture, parameters of which **are reliable**, focal length is 4-8mm. *If the camera allows to mount only mini-lenses (M12), the mini-lens with a known aperture (F2.0) is needed.*
- Stand. It is recommended for convenience and accuracy.

*If you want to measure only the **maximum exposure time**, and measuring the **threshold illumination** is not required, then luxmeter, incandescent lamp and power supply are not needed. Instead, it is required a manual iris lens.*

Order of work

1. Set the lens on the camera, install the camera on the stand, point the camera at the screen of the oscilloscope, connect camera to computer, display image from the camera on the computer screen.
2. Place the luxmeter sensor near to the oscilloscope screen.
3. Enable a "night" mode in the camera setting.



4. Set the oscilloscope sweep time - **50ms/div**. Scan - automatic (If your oscilloscope has such settings).

On the oscilloscope screen a flying spot must be visible. On the computer screen instead of the spot, flickering segments will be seen.

5. Turn on the incandescent lamp. Turn off the ambient light.

If you need only to measure the maximum exposure time, then instead of changing light simple close iris on the lens.

6. Set the minimum brightness of the oscilloscope spot, to make the segments on the computer screen barely visible. Light of the spot should not affect operation of camera's automatics.
7. By moving the lamp away, reducing the illumination of the oscilloscope screen, detect a moment

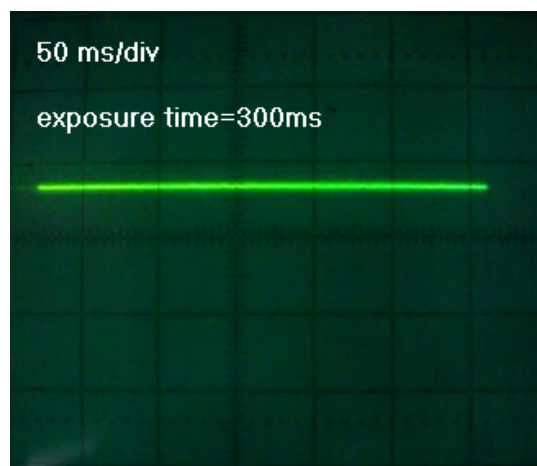
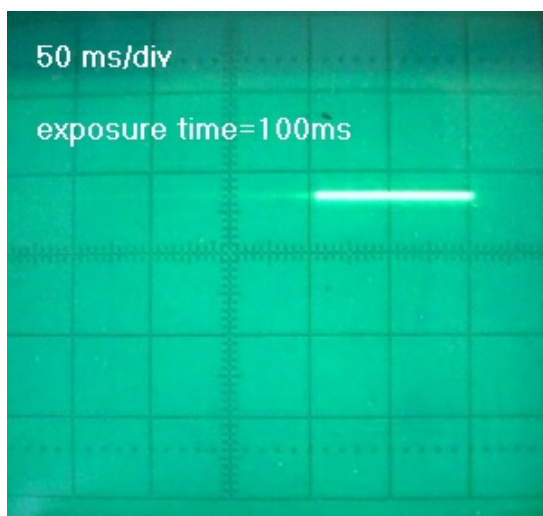
when the length of the segments on the computer screen becomes the maximum and no longer increases with further decreasing light until the appearance of strong noise on the screen.

At the moment when the length of the segments becomes maximum, luxmeter shows the threshold illumination.

As a result of our measurements, the threshold illumination was about 50lux. That is, when light is less than 50lux, the testing IP camera with 2 megapixel 1/3" CMOS sensor began to use the maximum exposure time.

8. Save and view a frame in which a segment of the maximum length gets wholly. If you can not get such frame, increase the oscilloscope sweep to 100ms/div.

The length of the segment in the frame in the scale of oscilloscope screen equals to the camera's exposure time.



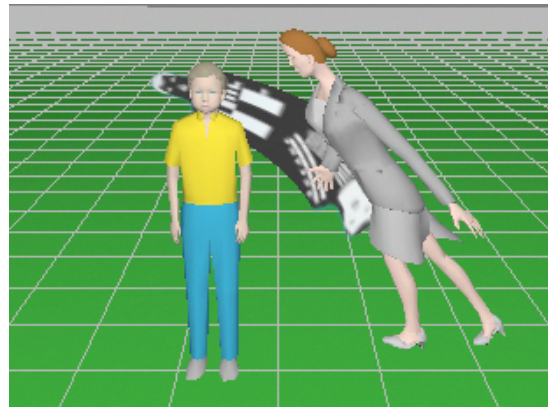
9. If necessary, by the method described above you can take a function of the exposure time in dependence of the light.

See also: Image parameter panel>Camera>Exposure

External link: ["The principles of CCTV design in VideoCAD. Part 5. Video surveillance of moving objects"\(*.pdf\)](#)

8.28 Example 28 Measuring rolling shutter row time of IP camera

*As a result of Rolling Shutter work, exposure of different rows of the image sensor begins and ends sequentially at different times, which causes a horizontal shift of moving objects. This effect occurs with many **IP cameras** with **CMOS** image sensor and usually doesn't occur with cameras with **CCD** image sensor.*



An important parameter of the rolling shutter is the **Row time** - the difference in time between the beginning exposure of neighboring rows. The less the **row time** is, the smaller the camera distorts moving objects. Unfortunately this parameter is not given in the camera specification. But it is not difficult to measure the row time in practice.

The **row time** may vary with different settings of the same camera.

VideoCAD7 offers a tool for modeling distortions of moving objects depending on the row time. But to use this tool, you need to know the row time.

Problem

There is a IP camera with Rolling shutter. It is necessary to measure its **row time** - the difference in time between the beginning exposure of neighboring rows.

Equipment:

- Oscilloscope. Any analog oscilloscope will suit.
- Low-frequency oscillator. Use any sine wave signal generator of any frequency in the range from 200 Hz to the upper limit of the oscilloscope bandwidth. You can use any homemade generator, software generator for a computer, etc.
- *For testing IP cameras it is enough to have possibility to display video on the screen and separate frames.*
- A Lens, focal length is 4-8mm.
- Stand. It is recommended for convenience and accuracy.

Order of work

1. Set the maximum image size in pixels in the camera setting.
2. Set the lens on the camera, install the camera on the stand, point the camera at the screen of the oscilloscope, connect camera to computer, display image from the camera on the computer screen. *The oscilloscope screen must completely cover the field of view in vertical. But it is not necessarily that the oscilloscope screen placed in the frame entirely. It is important that between the oscilloscope screen and the field of view of the camera must not be skew. On the computer screen,*

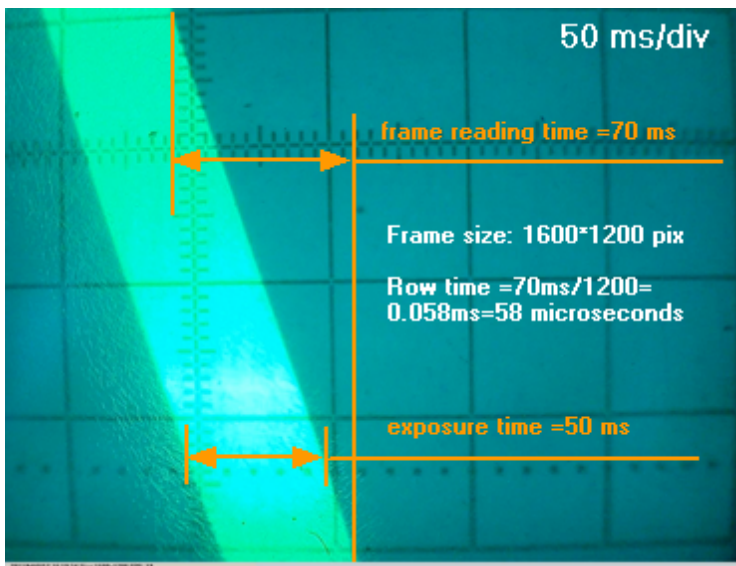
lines of the oscilloscope scale should be strictly parallel to the sides of the frame.



3. Set the oscilloscope sweep time - **50ms/div**. Scan - automatic (If your oscilloscope has such settings). Connect the Low-frequency oscillator to the oscilloscope. On the oscilloscope screen a flying thin vertical line must be visible. On the computer screen instead of the thin vertical line, thick inclined line will be seen. **The thickness of the line in the scale of oscilloscope screen equals to the camera's exposure time. The inclination of the line is determined by the row time of camera's rolling shutter.**

4. Save and view a frame in which the inclined line gets wholly. If you can not get such frame, increase the oscilloscope sweep to 100ms/div. If inclination is not enough, decrease the oscilloscope sweep to 20ms/div.

5. To calculate the **row time**, first read a difference between the edge of the line on the top and on the bottom of the frame in the scale of the oscilloscope screen - frame reading time = 70ms. And then divide the resulting time by the number of rows in the image (1200) and get the **row time = 58 microseconds**.



6. Repeat measurements for other frame sizes of the same camera.

*In the tested by us IP camera the frame reading time wasn't changed when changing the frame size from 640*480 to 1600*1200, and was about 70ms. Thus, the row time was from 58 to 146*

microseconds depending on the number of rows in the frame.

Perhaps the opposite situation, when the row time is stable, but the frame reading time depends on the number of rows in the frame.

See also: Image parameter panel>Camera>Rolling shutter

External link: ["The principles of CCTV design in VideoCAD. Part 5. Video surveillance of moving objects"\(*.pdf\)](#)

8.29 Example 29 Import of 3D models from Google SketchUp and Autodesk 3dsMax

VideoCAD has an opportunity of 3D modeling video surveillance scenes using constructions and [3D models](#)^[98] distributed with the program.

The distribution kit of VideoCAD includes several most relevant **3D models** for CCTV design. Though the standard package tends to be enough for accomplishing most of tasks, there may appear a need for library supplement.

Any 3D models and scenes which can be opened in **Google SketchUp** or **Autodesk 3ds Max** can be added to the VideoCAD library.

For exporting 3D models to VideoCAD the **Free Google SketchUp** version is suitable. <http://sketchup.google.com/>

Lots of 3D models can be downloaded from Internet for free. <http://sketchup.google.com/3dwarehouse/>

You can also create models and scenes in **Google SketchUp** or **Autodesk 3ds Max** independently.

We offer two special packages for importing 3D models into VideoCAD.

These packages contain:

- Plugin file;
- User Manual with step-by-step description how to insert a new 3D model into the VideoCAD library;
- Example of ready 3D model files.

The first package for importing 3D models and scenes from **Autodesk 3ds Max** is free. You can download it here: [Import of 3D models and scenes from 3ds max to VideoCAD](#)

The second package for importing 3D models and scenes from **Google SketchUp** is paid. [Click here to order it.](#)

8.30 Example 30 Teaching materials

When studying VideoCAD the educational article series **The principles of CCTV design in VideoCAD** is very useful.

[The principles of CCTV design in VideoCAD. Part 1. Camera view area](#) (*.pdf)

[The principles of CCTV design in VideoCAD. Part 2. Person detection area, person identification area, license plate reading area. Spatial resolution](#) (*.pdf)

[The principles of CCTV design in VideoCAD. Part 3. 3D modeling in VideoCAD](#) (*.pdf)

[The principles of CCTV design in VideoCAD. Part 4. Illumination and camera sensitivity in CCTV](#) (*.pdf)

[The principles of CCTV design in VideoCAD. Part 5. Video surveillance of moving objects](#) (*.pdf)

... to be continued...

These articles contain a short theoretical material and illustrated step by step instructions on how to use VideoCAD.

You can download the articles here <http://www.cctvcad.com/CCTVCAD-Download.html>

There you can also find:

VideoCAD User's Guide in *. pdf format

Package to import 3D models.

Other useful programs for CCTV design.

Part



IX

Recommendations on the program use

9 Recommendations on the program use

Precision in calculations

VideoCAD calculates results on the base of laws of geometrical optics, video sensor's characteristics, lighting engineering and radiometry. In some cases iterative algorithms are employed. Mathematical precision in VideoCAD calculations is not less than $\pm 1\%$.

At the same time, parameters of real cameras and lenses are not so precise.

When using a low-cost camera (e.g. KPC-400P) with PIN-HOLE lens ($F=3.7\text{mm}$) an error of determining vertical parameters is about $\pm 5\%$ and an error of determining horizontal parameters is up to 10-15 % (the actual horizontal sizes of view area proved exceed the calculated ones). The error depends on an object's location in a plane, perpendicular to the main optical axis projection. The errors were caused by significant geometrical distortions of short-focus PIN-HOLE lens.

Anyway, nobody can guarantee that just your camera and lens have no significant inequality of focal length value with the one declared in the specification or no significant geometrical distortions. It is advisable to test a camera with a lens by placing it on a table in especially crucial cases. The parameters and results can be divided by any constant value. For instance, you can place the camera at a 50-cm. height above a table, which will be equivalent to 2.5 m at factor 5. A place of camera installation will be the location of the lens optical center. All the results obtained are to be divided by 5, too.

If not performing such a test, it is recommended to leave a reserve about 10-15 % in the results.

Program speed and system requirements

Recommended system requirements:

- IBM compatible computer with 2 Core processor;
- 512 Mb of RAM;
- 40 Mb of free hard disk space;
- SVGA video adapter with Open GL 3D Hardware support;
- Windows 2000, Windows XP, Windows Vista, Windows 7 operating system;
- Wheel Mouse;

As with other CAD software, real system requirements greatly depend on complication of your working materials.

If you use a lot of 3D models, background file of tens of megabytes, you need more productive hardware.

But you can simplify your materials and make the same work on outdated computer. Thus there can't be clear system requirements which are correct in all cases.

Program speed depends on several factors.

Redraw speed of the image depends on number and complexity of displayed 3D models and the size of opened 3D window. VideoCAD offers powerful but resource-intensive operations for image processing, which can be enabled or disabled.

It is recommended to enable the resource-intensive operations only when needed and disable them during normal operation.

[VideoCAD Lite](#)^[17] and [VideoCAD Starter](#)^[29] may seem less demanding of computer resources because of absence of resource-intensive tools. However, these tools when they are not needed, can be disabled in version Professional too.

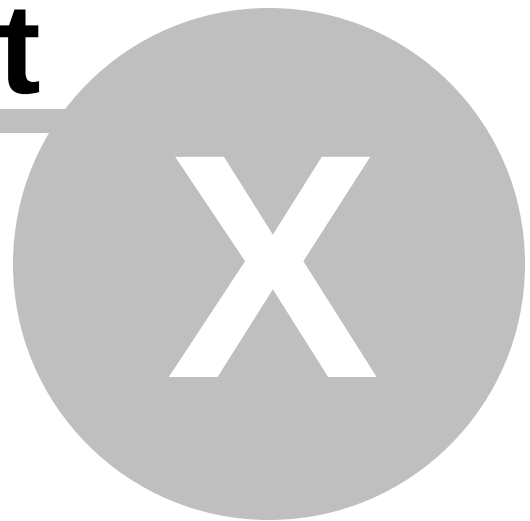
See details: [Errors in 3D window](#)^[174]



Mastering VideoCAD

To master the program it will be very useful to get acquaintance with [The principles of CCTV design in VideoCAD](#) articles.

Part



**Ordering and
contacting**

10 Ordering and contacting

[Contacting CCTVCAD Software](#)^[264]

[Order and Registration](#)^[265]

10.1 Contacting CCTVCAD Software

For the latest versions of our programs, please check our web site at <http://www.cctvcad.com>

Any questions can be e-mailed to us at info@cctvcad.com
Technical questions can be e-mailed to us at support@cctvcad.com

We try to answer e-mail as quickly as possible.

You may also use our on-line form on our website <http://www.cctvcad.com/CCTVCAD-Support.html>.

Telephone support is available only by request. If you need telephone support, or just want to talk to a live person, please contact us at one of the above addresses for the current hours of availability, as they change often.

If you have ideas, suggestions, comments, criticisms, or questions, we would love to hear from you about our programs!

10.2 Order and registration

[Order](#)^[265]

[Regulations of upgrading previous VideoCAD versions to VideoCAD 7 Lite and VideoCAD 7 Professional](#)^[265]

[Variants of protection from unauthorized copying](#)^[265]

[for VideoCAD 7 Starter](#)^[265]

[for VideoCAD 7 Lite](#)^[266]

[for VideoCAD 7 Professional](#)^[266]

[Program registration in the case of the HID basis protection](#)^[266]

[First registration](#)^[266]

[Reserve registration](#)^[267]

[Program registration in the case of the USB dongle basis protection](#)^[267]



Order

For the latest order options, visit the CCTVCAD Software web site at:

<http://www.cctvcad.com/CCTVCAD-Order.html>



Regulations of upgrading previous VideoCAD versions to VideoCAD 7 Lite and VideoCAD 7 Professional

For the upgrade options, visit the CCTVCAD Software web site at:

<http://www.cctvcad.com/CCTVCAD-Order.html>

- For the customers who have purchased VideoCAD6 (or upgraded to VideoCAD6) after **01 January 2011** upgrade cost makes a difference between cost of VideoCAD7 and VideoCAD6.
- For the customers who have purchased VideoCAD6 (or upgraded to VideoCAD6) before **01 January 2011** updating cost makes half of the VideoCAD7 cost.
- For the customers who has VideoCAD1..VideoCAD5 and didn't upgrade to VideoCAD6, updating cost makes 3/4 of VideoCAD7 cost.
- Upgrade Lite version to Professional is paid in addition.
- For the customers, whose original valuable suggestions have found application in VideoCAD 7.0, the additional discount for upgrade is given.

VideoCAD 7.0 Professional can work **only with USB Senselock**^[272] **dongle**. HID registration with the Professional version is impossible. Senselock dongles from VideoCAD 6.XX are supported. In case of absence of USB Senselock dongle it is necessary to purchase it. Guardant dongles are not supported by VideoCAD 7.0.

VideoCAD 7.0 Lite can work with [USB Senselock dongle](#)^[271] and with the HID registration.

Variants of protection from unauthorized copying



for VideoCAD 7 Starter

[VideoCAD 7 Starter](#)^[29] is registered only by personal registration code, without dongle, without

hardware locking.

☐ for VideoCAD 7 Lite

VideoCAD 7 Lite^[17] is offered with two variants of protection:

- the protection on the HID identifies basis with the tie to computer parameters;
- the protection on the USB dongle basis (for the USB port). The program is operable on any computer, to the port of which the dongle is connected.

You can order **VideoCAD 7 Lite** with the variant of protection to your choice.

When buying the variant with the USB dongle one registration with the tie to computer parameters is given. In that way you can start working with the program not waiting until receiving the dongle. After receiving the dongle you may use the program on any computers.

You can exchange the variant with the tie to computer parameters to the variant with the dongle, paying in addition for the cost of the dongle and its delivery.

☐ for VideoCAD 7 Professional

VideoCAD 7 Professional is offered with one variant of protection:

- the protection on the USB dongle basis (for the USB port). The program is operable on any computer, to the port of which the dongle is connected.

VideoCAD 7.0 Professional can work **only with USB Senselock**^[272] **dongle**. HID registration with the Professional version is impossible.

When buying the **VideoCAD 7 Professional**, we offer one registration of **VideoCAD 7 Lite** with the tie to computer parameters. In that way you can start working with the program not waiting until receiving the dongle, but with **Lite** version for a while. After receiving the dongle you may use the **VideoCAD 7 Professional** on any computers.

Program registration in the case of the HID basis protection

☐ First registration

*First registration is carried out equally for both variants of protection. But in the case of protection on the USB dongle basis you may not fulfill the first registration and wait for the dongle delivery. For this protection variant the possibility of the first registration is **only for your convenience, to make you start working with the program before getting the dongle.***

*VideoCAD 7.0 Professional can work **only with USB Senselock**^[272] **dongle**. HID registration with the Professional version is impossible. When buying the **VideoCAD 7 Professional**, we offer one HID basis registration of **VideoCAD 7 Lite**.*

After payment is confirmed a link to the full version of VideoCAD with protection on HID identifiers basis will be mailed to the e-mail address you've specified.

Having installed VideoCAD according to the instruction enclosed herewith you will get a unique identifier for your computer system - HID.

E-mail to support@cctvcad.com specifying the following information:

- Your name (the same, as at payment);
- HID;

You may also use our on-line registration form on our website <http://www.cctvcad.com/CCTVCAD-Register.html>

If your computer is not connected to the Internet, you may mail from any other computer.

After your registration key is entered the program is completely operable.

You may install and deinstall VideoCAD on this computer system for unlimited number of times.

As a result of replacing or formatting your hard disk, reinstalling operation system or other upgrading, your HID might be lost and registration will be lost too.

For this case two reserve registrations are granted which are performed free-of-charge.

Although the number of reserve registrations is limited to two, the registration counter cleaning is regularly realized. So you won't lose the purchased program in any case. If you spend all reserve registrations before the registration counter cleaning, you will have to wait for the next registration counter cleaning to continue using the program.

Reserve registration

The reserve registrations are performed only for the HID basis protection and only for VideoCAD 7 Lite version. In the case of dongle basis protection the program will be operable on any computers, if the dongle is connected to its USB port. So the reserve registrations won't be necessary.

In case your HID is lost as a result of your computer system upgrade and VideoCAD requests registration key at start, **try entering the name and the first registration key.** If first registration key is not valid, you will need a reserve registration.

Two reserve registrations are performed free-of-charge. To get the reserve registration mail to support@cctvcad.com specifying the following information:

- Your name (the same as at first registration);
- First registration key;
- Ordinal number of current registration;
- HID, which is shown in the Registration box.

You can also use our on-line registration form on our website <http://www.cctvcad.com/CCTVCAD-Register.html>.

In reply you will get a new registration key.

In other respects a reserve registration is the same as the first one.

Program installation in the case of the USB dongle basis protection

After buying VideoCAD you can install and register it on one computer before getting the dongle (See above: "[First registration](#)"^[266]).

This opportunity is only for your convenience, to make you start working with the program immediately after buying. You may not use this opportunity and wait until getting the dongle. The dongle will be sent to you through Express mail service. After getting the dongle you can reinstall VideoCAD as many times as necessary on different computers not breaking the License agreement. VideoCAD will work on any computer to which the dongle is connected.

Important!

- a) USB dongles may be attached and removed when the computer is powered on or off.**
- b) Dongle disconnection during the program running can lead to the program damage.**
- c) USB dongle is a material carrier of the VideoCAD license. In case of losing the dongle the**

license is considered lost too.

d) When using the dongle it is necessary to follow [USB Dongle](#)²⁷³¹ topic.

- 1.** In case your operating system is **Windows 2000, Windows XP, Windows Vista, Windows 7** enter under LOCAL administrator account (administrator account is required only at installation).
- 2.** Unpack archive in case VideoCAD was supplied in archived file.
- 3.** Exit all running programs.
- 4.** Start **Setup.exe**.
Dongle driver will be installed automatically.
- 5.** Reboot the system if necessary.
- 6.** Attach **USB dongle** to an available USB port.

*Successfully installed dongle should appear on the list of devices of the Windows device manager as Senselock **SenseIV EL v2.x.** in the **Smart card readers** directory.*

- 7.** After the dongle installation has been done successfully launch VideoCAD.
- 8.** Copy the coming with the dongle pair "name - registration key" in the boxes of the same name and click the button OK.
- 9.** Reboot your computer if necessary.

** If the registration of VideoCAD on the HID identifier basis has been done on you computer earlier, then the box of the registration request will not appear. You may continue using the program until the loss of HID in the case of hard drive formatting or other serious upgrade. After HID loss the box with the registration request will appear, where you can enter coming with the dongle pair "name - registration key" (at that the dongle should be connected!).*

*** Coming with the dongle pair "name - registration key" is not tied to computer and can be used many times on any computer to which the dongle is connected.*

We do not guarantee VideoCAD operability on the computers, which are installing programs used for cracking software protection.

Part



XI

USB dongle

11 USB dongle

Dongle is a device used to protect applications and data against unauthorized usage and replication. The dongle is attached to the computer's USB port.

- **VideoCAD 7 Professional** can work only with USB Senselock dongle. HID registration with the Professional version is not applied.
- [VideoCAD 7 Lite](#)^[17] can work with **USB Senselock dongle** and with the HID registration.
- [VideoCAD 7 Starter](#)^[29] is registered only by personal registration code, without dongle, without hardware locking.

[Dongle models](#)^[272]

[Operating instructions for USB dongles](#)^[273]

11.1 Dongle models

When ordering VideoCAD you can choose USB dongle from the following models:

*The models differ in embodiment only. Universal dongle **SenseLock EL-STD** is provided by default. To get notebook dongle **SenseLock EL-Genii**, specify it at your order.*

SenseLock EL-Genii

Senselock EL-Genii is featured as a cute, tiny and fascinating gadget with fashionable color. Its size is only 17x12x4mm, and weights 2.8 - 3.5g. It is especially suited for notebook computers.

When any software with a common USB dongle is used on a notebook computer, the dongle often suffers unexpected impact or collision due to its long body, which may lead to damage on USB port. With a smart appearance and exquisite body, Senselock EL-Genii effectively avoids these situations, thus reduces the possibility of damaging the computer and secures the software running on it.



SenseLock EL-STD

SenseLock EL-STD is a complete analog of SenseLock EL-Genii, but in classic design. It is suited for desktop computers.



11.2 Operating instructions for USB dongles

Operating Instructions for USB Dongles

[Dongle Operating and Storage Instructions](#)^[273]

[Possible problems](#)^[273]

[Warranty](#)^[273]

Dongle Operating and Storage Instructions

1. Protect the dongle from physical damage (fall, toss, vibration, etc.), exposure to high and low temperatures, aggressive environments, high voltage; all these may cause damage to the dongle.
2. Do not press too hard when connecting the dongle to the computer.
3. Do not expose the dongle (especially its connectors) to dust, dirt, damp, etc. In case dirt gets into the dongle connectors arrange for their cleaning. Use a dry cloth to clean the case and connectors. Never use organic solvents.
4. Do not disassemble the dongle. This may cause damage of the dongle's case, printed wiring elements, and consequently lead to unstable functioning or failure of the hardware.
5. In case of failure or improper functioning of the dongle, contact us.

Note: For stable functioning of the dongle it is required to use **dongle driver**.

A set of drivers for various operating systems is supplied together with the VideoCAD.

The driver is installed automatically during VideoCAD installation.

To install or reinstall driver manually choose All programs>VideoCAD>Dongle driver. Then choose Install driver or Uninstall driver.

Possible problems

In case of any problems with USB dongle, first of all, do the following:

1. Stop VideoCAD, if it is running.
2. Disconnect the dongle from the USB port.
3. Reinstall dongle driver.
 - 3.1 Enter under LOCAL administrative account. No Domain account!
 - 3.2 Choose Start>All programs>VideoCAD7>Dongle driver
 - 3.3 In the appeared box choose **Install driver**.
4. Connect the dongle to the USB port then follow the [instructions](#)^[268].

If these actions don't solve your problem, try to install VideoCAD, dongle driver and the dongle on other computer according to the [instructions](#)^[267].

Possible reason of problems is connected to installed dongle emulators for other software.

Warranty

The USB dongle is a material carrier of the VideoCAD license. In case of losing the dongle the license is considered lost too.

In case of dongle failure during one year after purchasing and the dongle has no any physical damage marks, the Dongle can be exchanged free-of-charge.

In case of failure later than in one year after purchasing or the Dongle has physical damage marks, the Dongle also can be exchanged, but after payment for the new Dongle and its delivery.

In any case sending the new Dongle can be performed only after receiving the broken one.

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